The Global CKD Launch Process Owners Manual

Version 2.0

June 1, 2008

This text is version *2.0* of the CKD Global Launch Process and is intended to be utilized as a guideline for all CKD Launches. This manual describes, in detail, the activities that make up the required common process for all GM vehicle programs.

In order to continuously improve this document and the Launch Process, the readers are encouraged to offer change or enhancement suggestions using the Change Request form on the last page of this manual. All changes will be reviewed by the **Global Launch Process Team** listed below for consideration of inclusion into the next release of this manual.

Contacts for Feedback:

Marty Tepatti GMNA
Alan Ibanes GMLAAM
Pat Le Page GMNA
Luiz Cuccioli GMLAAM
Mark Beni GMAP
Fabio Chiovatto GMLAAM
Gwangmoon Ko GMAP
Wonkyung Suh GMDAT
Charnsak Laicharoenchokchai GMTH
Kyujong Park GMDAT
Peter Berg ***GME***
Christina Kastritis GMDAT
Stefan Albrecht ***GME***

The latest version of the Global CKD Launch Process Owner's Manual is available on the Launch Process web site at:

http://manufacturing.gm.com/nacg_orgs/mpmgt/common_process_mgr/plp/homepage.html#top

Once printed this document is UNCONTROLLED

© Copyright by General Motors Corporation. This material is protected by a GM Manufacturing Center Copyright. It is unlawful to copy or disseminate any part of this manual without written permission of General Motors.

Table of Contents

Background....7
Preface....7
Launch Process Template....8
Foundations for a Successful Launch....10
Flawless Launch Guidelines....11
Key Launch Enablers for Best-In-Class (BIC)....12
Definitions....13
CKD Framework....15
CKD GLOBAL LAUNCH PROCESS TEMPLATE....16

A. Organization....17

A1. Assign Plant Launch Manager....17
A2. Assign Plant Launch Team Members....17
CKD Core Launch Team Membership....19
A3. Assign Issue Resolution Process Teams....20
Issue Resolution Process....25
A4. Develop Launch Team Master Staffing Plan....27
A5. *Analyze & Apply* Launch Lessons Learned....28
A6. Develop Production Launch Performance Targets....28
A7. Develop Manufacturing Expense Budget....29

B. Planning....31

B1. CKD Concept Definition Established....31
B2. CKD Master Timing Plan Established....31
B3. Develop Program Quality Plans....32
*B4. Establish Product Quality Standards & Integrate into Standardized Work*37
B5. Manufacturing Quality Launch Plan Established....38
B6. *Develop Manufacturing* Vehicle Build Plan....39
B7. Stamping/Press Shop Validation Plan....43
Develop Production Team Member Training Plan....46
B8. Body Shop Validation Plan....47
Develop Production Team Member Training Plan....49
B9. Paint Shop Validation Plan....50
Develop Production Team Member Training Plan....51
B10. General Assembly Shop Validation Plan....53
Develop Production Team Member Training Plan....54

B11. Develop End of Line Test Readiness Plan.....56
B12. Develop Build By Objective Plan for Product, Process and People.....57
B13. Develop Dimensional Validation Plan.....58
B14. Develop CKD Matching Process.....59
B15. Communicate Launch Change Management Process.....61
B16. Monitor Product Design Release Status.....63
B17. Confirm Part Sourcing & Localization Plan.....63
B18. Develop Supplier Communications Plan.....64
B19. Perform Advanced Product Quality Planning Assessment.....64
B20. Monitor Master Process *Documents (MPD) Status*.....64
B21. Develop Vehicle Sales Service & Marketing (VSSM) Vehicle Launch Plan 65
B22. Develop Supply Chain Part Plan *(formerly PFEP)*.....66
B23. Develop and Communicate Employee Participation Plan.....67

C. Training.....69

C1. *Develop & Implement Plant Launch Training Plan*.....69
C2. Complete Launch Team Bill of Training.....71
Launch Team Bill of Training.....72
C3. Participate in Launch Team Workshops.....73

D.Plant Preparation.....75

D1. CKD Receiver Plant Process Review @ CKD Source Plant.....75
D2. Stamping/Press Shop Readiness.....75
Complete Manufacturing System & Facilities Installation.....75
Execute Stamping / Press Shop Tryout.....76
Complete Operation Readiness and Certification (GMS Workstation Readiness) 78
Complete Maintenance Readiness and Certification.....79
D3. Body Shop Readiness.....80
Complete Manufacturing System & Facilities Installation.....80
Iterative Match/Reverify System Function, Body Test and Body Tryout.....81
Complete Operation Readiness and Certification (GMS Workstation Readiness) 83
Complete Maintenance Readiness and Certification.....83
D4. Paint Shop Readiness.....84
Complete Manufacturing System & Facilities Installation.....84
Paint Shop Tryout.....85
Complete Operation Readiness and Certification (GMS Workstation Readiness) 87
Complete Maintenance Readiness and Certification.....87
D5. General Assembly Readiness.....88
Complete Manufacturing System & Facilities Installation.....88
General Assembly Tryout.....89

Complete Operation Readiness and Certification (GMS Workstation Readiness) 90
Complete Maintenance Readiness and Certification 91

D6. CKD Parts Quality Management 92

D7. Launch Operations Center 92

D8. After-sales Plan 93

D9. Perform Line Balance 94

D10. Confirm Process Monitoring – In-Plant Builds 94

D11. Assess Supplier Launch Readiness 95

D12. Report Status at Manufacturing Readiness Reviews 96

D13. Complete Global Launch Process Assessment 96

E. In-Plant Build Activities 99

E1. *Execute* Manufacturing Confirmation Builds 99

E2. KD EPL/SPL Verification Builds 99

E3. Conduct Product/Process Validation Vehicle Build 100

E4. Monitor Launch Change Management Process 101

E5. Execute VSSM Vehicle Launch Plan 102

E6. Metal and Surface Audit Validation Process Surface ("Black Painted Vehicle Reviews") 102

E7. Packing Events 103

E8. Perform Production Part Approval Process (PPAP) 104

E9. Assess Supplier Run-at-Rate/Build-at-Rate 104

E10. Un-Packing Events 105

E11. Complete Manufacturing Validation Builds 105

E12. Validate Assembly Process Throughput 110

E13. Validate Material Flow and Shipping Plan 110

E14. Conduct Launch Quality Assurance Processes 111

APPENDICES 115

APPENDIX A: Acronyms and Abbreviations 115

APPENDIX B: Roles and Responsibilities 122
Administrative Assistant 122
BIW ME Execution Lead 123
Body Quality Lead 125
Body Shop Coordinator 126
Body Shop Launch Manager 128
Change Management Coordinator 130
Change Management Leader 131
Dimensional Performance Engineer 132
Dimensional Program Manager 133
Electrical Launch Coordinator 134
IE/GMS Future Program Execution Manager 135

General Assembly Engineering Integration Manager....137
General Assembly Launch Manager....138
GLP Launch Advisor....140
Global Launch Support Team (GLST) Member....141
IRT Co-Chair....142
IS&S Launch Manager....143
Launch Training Manager....144
Manufacturing Integration Manager....146
Material Launch Manager....147
Paint Shop Launch Manager....149
PIT Leader....151
Plant Launch Manager....152
Plastics Launch Manager....154
Program Engineering Manager....156
Program Investment Manager....157
Program Quality Manager....158
Purchasing / Supplier Quality Launch Manager....161
Quality Launch Manager....162
Vehicle Dimensional Quality Manager....165

APPENDIX C: Common Process Websites Listing....166

APPENDIX D: Material Disposition/Work Order Effective Points....167

APPENDIX E: Supplier Communication Conferences....168

APPENDIX G: Best-in-Class Launch Targets....169

APPENDIX H: GLP Functional SME Core Team....171

APPENDIX J: PIT Flow Chart....172

APPENDIX K: IRT Flow Chart....173

APPENDIX M: Shipping of Quality Assessment Vehicles....174

APPENDIX O: Global Launch Process Training Class....178

APPENDIX P: Global Launch Process Workshop Description....179

APPENDIX Q: Launch Execution Meetings....180

APPENDIX T: Launch Cadence Guidelines....189

APPENDIX V: GLP/CKD Manual Change Approval Process Flow....191

APPENDIX W: CKD Global Launch Process Change Request Form....192

Introduction

Background

GM top leadership identified a need for developing and documenting a common, global CKD Launch Manual. This CKD Launch Process Manual is a derivative of the Global Launch Process and is to help identify the people requirements and skills to ensure production readiness and quality.

Preface

The **CKD** Global Launch Process is the GM common process to plan and deliver vehicles to meet program quality and throughput requirements for all **CKD Launches Globally.**
Specifically, this process provides the event timing and structure (e.g., launch team) necessary to identify and resolve as many issues as possible prior to Start of Regular Production (SORP). Benchmarking has shown that in order to have a successful launch (high quality, low cost, and fast to market), there must be only a small number of open issues remaining at SORP. Managing the issues to a low level is a major task of the launch team.

This common process text provides the most recent process and procedures that are utilized throughout the launch phase of the program development cycle. This phase occurs at Verified Data Release (VDR) and continues until Launch Team Release (LTR). The process requires a cross-functional Production Launch Team staffed from the Plant(s), the Operating Groups and the Engineering Centers on a pull basis.

Rapid and effective issue resolution is the key to competitive launch performance. Competitive acceleration rates can only be achieved if the total number of open issues is reduced to a low level by Start of Regular Production. Every effort must be made to identify and resolve as many issues as possible prior to starting the Manufacturing Validation Builds and prior to Start of Regular Production.

The purpose of this manual is to provide the template for a Production Launch Team to organize, plan, and execute the production launch of new vehicles in GM assembly plants. Check lists and reference documents are also provided to help the launch team. These are categorized as:

Common Processes – Those processes sanctioned by GM leadership (Process Leadership Board, Strategy Board, etc.) to be used across GM.

Templates – Examples of successful applications of a methodology used for executing a particular task.

In addition, we have added to our website a number of Common Processes and Templates that can be downloaded for use by the Production Launch Team.

The Launch Process is closely aligned with the Global Vehicle Development Process (GVDP). A number of key Launch Process elements are defined as program deliverables in the Global Vehicle Development Process. The Launch Process elements that are defined as Global Vehicle Development Process deliverables signify crucial interface points to the program. Timing is based on the **CKD GVDP** framework.

Launch Process Template

The Launch Process Template consists of all the key activities required to organize, plan and implement the Launch Process. Key events related to plant preparation and in-plant vehicle builds are also included in the template. The template provides the timeline that must be used as a basis for creating the program specific plan.

Every program will require adjustment to timing based on the program complexity and the need to integrate the production launch activities with other program activities and timing. The only differences between the plan and the template are expected to be issues of timing and activity scope. In some cases, a program may require additional activities to cover complexity or site-specific situations.

The key events for a successful production launch are classified into following categories (A-E):

A. Organization: A multi-disciplined launch organization, led by a *Plant* Launch Manager (PLM) and the Program Engineering Manager (PEM). They must be in place in the very early stage of the vehicle development process. The launch team starts with a few key members, and then is expanded as the program progresses. Initially, this team may have part time responsibility, but as the program progresses, their responsibility becomes full time. Perhaps the most crucial role for the Launch Manager is to ensure that multi-functional problem resolution teams are established and functioning at the appropriate times. These teams will be necessary to properly utilize the 7- diamond Issue Resolution format to ensure product and process readiness well in advance of the in-plant builds.

B. Planning: **P**lanning begins with the setting of program quality and launch performance targets (prior to Charter). It ends with the establishment of a detailed vehicle build plan from first on-line build through full acceleration. A few key activities in production launch planning include the material plan, manufacturing system and subsystems validation plans, and the acceleration plan. This section also emphasizes the importance of an integrated Issue Resolution Process, a strict adherence to the Red Zone and a structured Launch CAB Process with a well trained team.

C. Training: Launch specific training needs will be defined, developed, delivered, and evaluated for all employees involved in the assembly plant activities. Beginning with an overview of the Global Launch Process and ending with a confident assembly team ready to safely contribute to the success of the launch. The scope of this challenge requires that the training be well planned and professionally implemented using a common Vehicle Launch Training Process. This will include:

- Global Manufacturing System / Culture Change
- Quality / Materials
- Information Systems and Support
- Technical Operations and Maintenance

All training identified and documented in the Launch Training Plan will be approved by plant and program leadership. The training delivery will be both classroom and hands-on application to ensure understanding and development within the workforce.

D. Plant Preparation: Plant preparation begins with manufacturing system installation. The Launch Operations Center, the Dimensional Validation boards, and the Launch- Cab process environment are a few examples of plant preparation activities.

E. In-Plant Build Activities: This is the final phase of the production launch. Key activities that happen during this phase include the validation of the manufacturing system at line rate, teardown, job instruction training, building of on-line vehicles, identification, correction and containment of problems, and acceleration to planned straight time rate.

-10-

Process (Red

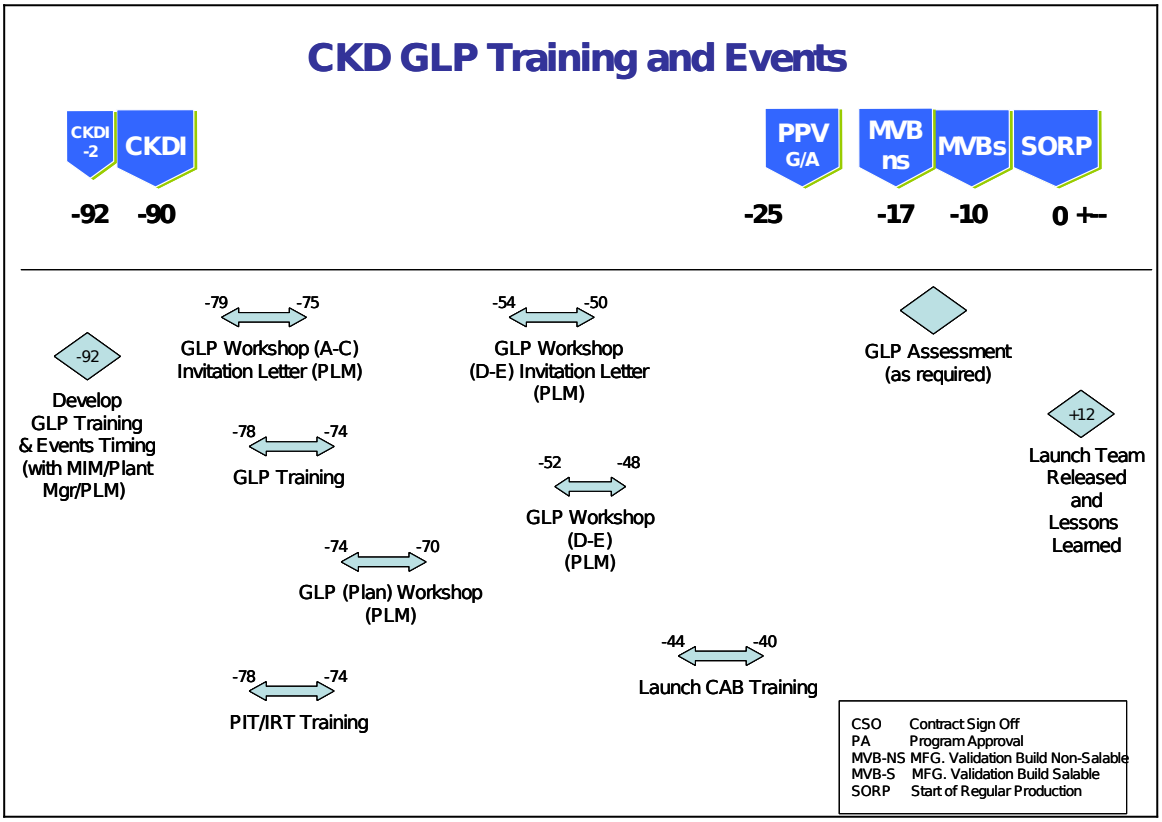
Launch Team Release (LTR)

Revised 9/27/05

Global Launch Advisor

Each vehicle program is assigned a Global Launch Advisor to assist in program launch per the GLP activities. Either the MIM or PLM are responsible for completion of Key Events in the CKD GLP. The Launch Advisor trains the program team in the Global Launch Process, supports the MIM / PLM in program workshops, and monitors the execution of the GLP.

The GLP includes a series of Workshops and Training activities supported by the GLP Advisor to review plans that are critical to launch success. These activities are outlined in the following GLP Calendar of Key Events.



Foundations for a Successful Launch

There are a number of key factors for achieving a successful Launch. The likelihood of success is higher when the disciplined approach of the Global Launch Process is utilized.

1. **Assembly Centers "Own the Launch":** By the selection of proficient launch team members and through the execution of the Manufacturing Validation Builds, the success for the launch is dependent on the Assembly Centers assuming ownership of the process.

2. **Plant Launch Team:** Early assignment of an empowered Launch Manager and cross-functional Launch Team allows for informed, rapid decision making and strong Project Management.

3. **Rigorous adherence to timing of events critical to launch:** Validated design controlled engineering changes, and PPAP part status availability to support all in-plant, on-line build events.

4. **Supplier/Launch Process Integration:** Timely supplier identification and development enables supplier reliability and performance to meet all build events. Identification and communication of the content (including combinations) and quantities of builds to all suppliers (including Powertrain) is essential.

5. **Early assembly plant participation and operator training:** Communication of the launch plans, participation on early builds and operator training drive employee enthusiasm and job performance proficiencies.

6. **Validated product design prior to Manufacturing Validation Builds:** Controlled engineering changes allow for validation of the manufacturing system and operator learning prior to the launch acceleration.

7. **Manufacturing Validation Builds:** More in-plant, on-line vehicles built in buckets before SSF, provide the opportunity for iterative, methodical problem solving. This event allows for early captive fleet vehicles and enables rapid issue resolution.

8. **Rapid Problem Closure Rate:** It is crucial to pre-qualify issues and engage the Issue Resolution Team/Plant Issues Team problem solving teams to collectively determine a course of action for each issue. The 7-diamond problem solving process is the common, proven and effective tool utilized on launch teams to systematically execute issue resolution.

9. **Validated manufacturing system prior to SSF:** An organized, common approach to manufacturing validation enables higher manufacturing process capability.

10. **Integration with other common processes:** Global Vehicle Development Process, Vehicle Launch Training process, IS&S Global Launch Process,

Powertrain Launch Process and Program Quality Readiness Review are all enablers to successfully implement the Global Launch Process.

Flawless Launch Guidelines

	Program Name	Assembly Plant	GLP W/Shop	MVBNS	EOA
PLAN	1	No operating plan or line rate changes in launch window (PPV to EOA)			
	2	No scheduled overtime			
	3	Planned acceleration curves should be Best in Class Targets			
	4	Vehicle order availability to support launch plans to full rate.			
	5	Ensure styling freeze date (too many late requests)			
PARTS	6	No vehicles will be built with part shortages			
	7	On-time product release			
	8	Run at rate complete and on-time to support volume production			
	9	Performance to the global agreement on level of full PPAP			
	10	Product Validation sign off prior to the start of Saleable MVB			
	11	No change of suppliers or manufacturing sites or processes of existing suppliers during launch			
	12	No known retrofits at MVB-Saleable			
	13	Rigorous tracking and closure of Parts Not on Contract (PNOC) and Temporary Work Orders (TWO/PAAs) from wk -46 to EOA			
PEOPLE	14	Adequate and qualified resources staffed in the Core and Extended Launch Teams			
	15	Plants must be fully staffed and trained with adequate resources to allow MVB-S to be built by production operators with team leaders free 100% of the time during launch			
	16	MVB-S builds are to be assembled by operator/team who will perform the work during normal production			
	17	Minimize and control the movement of people in the plant(s) during launch			
PROCESS	18	The manufacturing system must be fully validated and operators fully trained prior to SSF			
	19	The vehicles should be within its Quality Glide paths (Warranty, J .D. Power & GCA-Priorities) at SORP			
	20	All Red Ergonomic issues must be resolved prior to acceleration			
	21	Integration site should build vehicles in production sequence with representative parts using production datums			

2007-02-14

R Outside Guidelines

G Within Guidelines

Key Launch Enablers for Best-In-Class (BIC)

These BIC enablers have been reviewed and approved by the Manufacturing Leadership Team (MLT). Likewise, the Enablers have been reviewed with Manufacturing Vice-Presidents and are considered as key to launch success per Gary Cowger, Group VP of Global Manufacturing & Labor.

In the Best-In-Class Target setting activity, there are launch specific examples included for each program classification code to support these enablers. For additional information and details, contact your program's Launch Advisor.

1. Ensure styling freeze date (too many late requests)
2. 100% timing and integrity (quality) of Engineering release
3. Product Validation sign-off prior to start of saleable MVB
4. No change of suppliers or manufacturing sites or processes of existing suppliers during launch
5. Run-at-Rate Complete and On Time to support Volume Production
6. Adequate and Qualified resources staffed in the Core and Extended Launch Teams
7. Vehicle order availability to support launch plans to full rate
8. Rigorous tracking and closure of issues, Parts Not On Contract (PNOC) and Temporary Work Orders (TWO/PAAs) from WK-46 to End of Acceleration (EOA)
9. No operating plan or line rate changes in launch window (PPV to EOA)
10. Performance to the global agreement on level of full PPAP
11. The manufacturing system must be fully validated and operators fully trained prior to Start of System Fill (SSF)

Definitions

1. Global Launch Process (GLP)

The Global Launch Process is the GM common process to plan and deliver vehicles to meet program quality and throughput requirements with minimum production loss during rapid acceleration and maximum profit. This common process guides the Vehicle Line Executive (VLE) Team and Production Launch Team from Pre-Contract Signing to End of Acceleration and covers all activities necessary for program launch. The process requires a cross-functional Production Launch Team staffed from Plant(s) the Operating Groups and Engineering Centers on a pull basis.

2. Manufacturing Confirmation Builds (MCB)

The purpose of a Manufacturing Confirmation Build event is to provide training for assembly plant operators and personnel. This event provides an opportunity to introduce new product to the assembly plant and provide vehicles necessary for training activities at the assembly plant.

3. Product & Process Verification Vehicle (PPV)

The Product/Process Vehicle event is used to produce vehicles for completion of VTS validation/verification/final calibration in areas where production tooled parts & production assembly process are required (all production processes to be used in original equipment/lines) and to begin the early validation of the production process plus training of the assembly plant personnel.

4. Manufacturing Validation Builds (MVB)

The on-line vehicles built in the assembly plant prior to Start of Regular Production. The purpose is to validate the manufacturing system, resolve process issues, and train assembly plant operators.

5. Source Plant

The plant whom is the primary source for the new model vehicle/parts. (This plant may also be the design-responsible, manufacturing- responsible, or plant which supplies parts to a CKD Launch.)

6. Receiver Plant

The plant that will combine the CKD kit and locally manufactured parts in order to assembly the vehicle.

7. Saleable

When a vehicle meets all engineering specifications, regulatory and safety requirements.

8. Start of System Fill (SSF)

The earliest start date for filling the plant manufacturing system with saleable parts (subassemblies into the Body Shop) occurs. All people, facilities, equipment, tools, and capital are in place for vehicle assembly of full production to begin.

9. Start of Regular Production (SORP)

Indicates the milestone or event that established the assembly of the first vehicle/product produced off the assembly line for sale to dealers or the general public for a given model year. This milestone is identified on various timelines as week +/- 0.

10. Controlled Shipping

Period of time when every vehicle built is subjected to rigorous evaluation of all specified quality characteristics before they are shipped to customers. The objective is to ensure that any issues identified after Start of Regular Production are contained and corrected. This period should not exceed 2 weeks.

11. Ship to Commerce (STC)

The major activities of this statement of work are to review quality indicators, assess assembly plant readiness, and confirm production Program Quality Readiness Review recovery plans. These will signal the program's readiness to move forward with acceleration to full production.

12. Complete Knock Down (CKD)

Kits (set of parts) delivered by the Source Plant in order to be compiled and assembled together with local parts according to the legal requirements, (Localization) to produce the SUP (Single Unit Product) at the Receiver plant.

13. Semi Knock Down (SKD)

Painted bodies with a complete set of parts delivered by the Source Plant in order to be assembled together to produce the SUP (Single Unit Product) at the Receiver plant according to the legal requirements (KD Import).

14. Single Unit Product (SUP)

Unit assembled by the Source Plant and delivered to the Receiver Plant on wheels, following all legal requirements in terms of calibration and emissions, package protection and specific content, if any. Adequate owners' manual and service literature should be part of the unit, if required by the customer.

15. Start of Regular Production (SORP) = Start of Acceleration (SOA)

The SORP milestone or event marks the start of assembly of the first vehicle produced off the assembly line for sale to dealers or the general public for a given model year coincident to the SOA milestone. This event starts the clock for Duration of Acceleration.

16. Duration of Acceleration (DOA)

The time between Start of Regular Production and End of Acceleration is the duration. Corporate shutdowns and holidays are excluded for all reporting.

17. End of Acceleration (EOA)

End of Acceleration is the point in time at which the assembly plant has produced the new product at full contracted volume for one day with no Non-Scheduled Overtime at the product point.

18. Vanning (Stuffing)

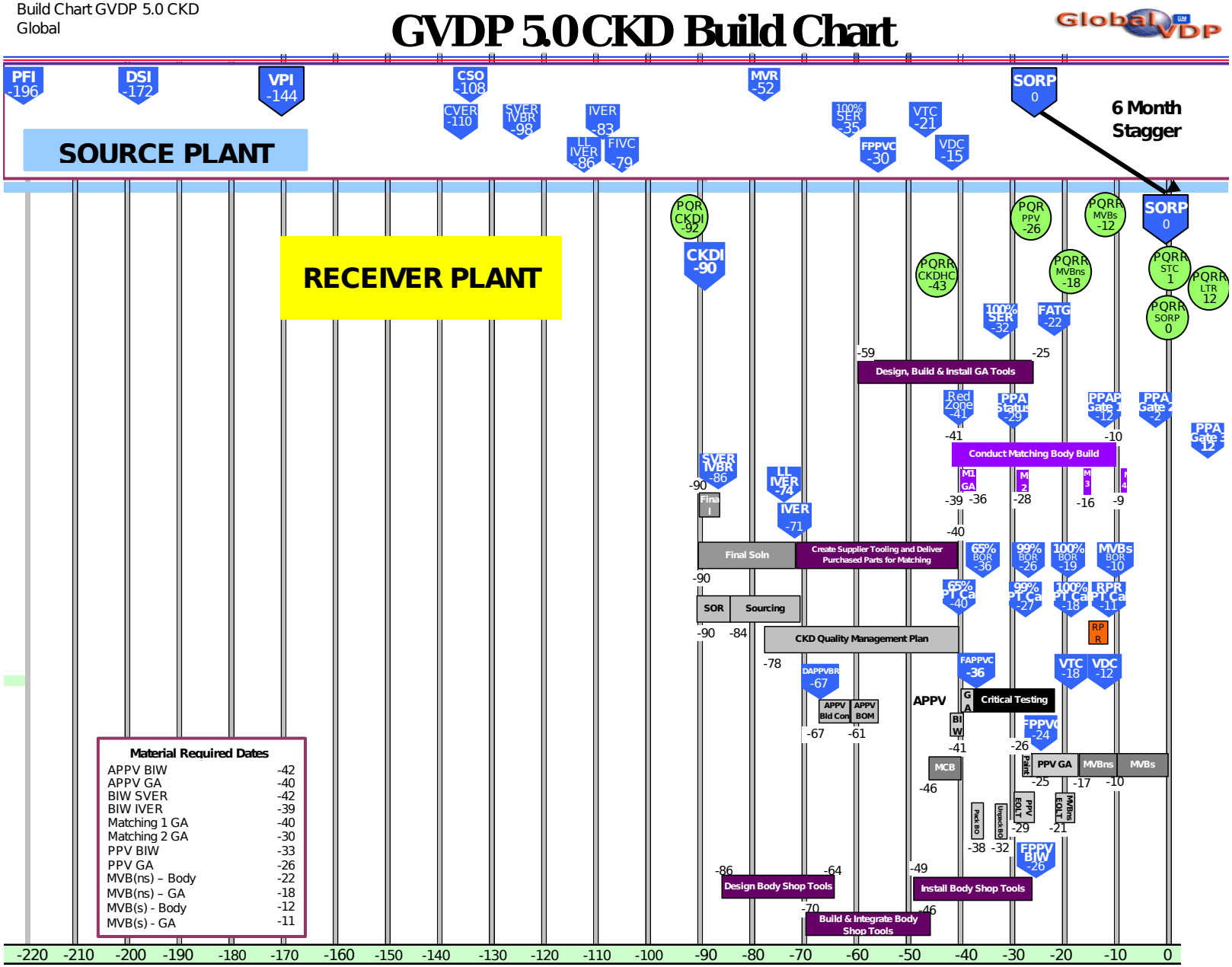
The process used in packaging a CKD kits/SKD unit into a standard sea-container prior to shipment.

19. Red Zone

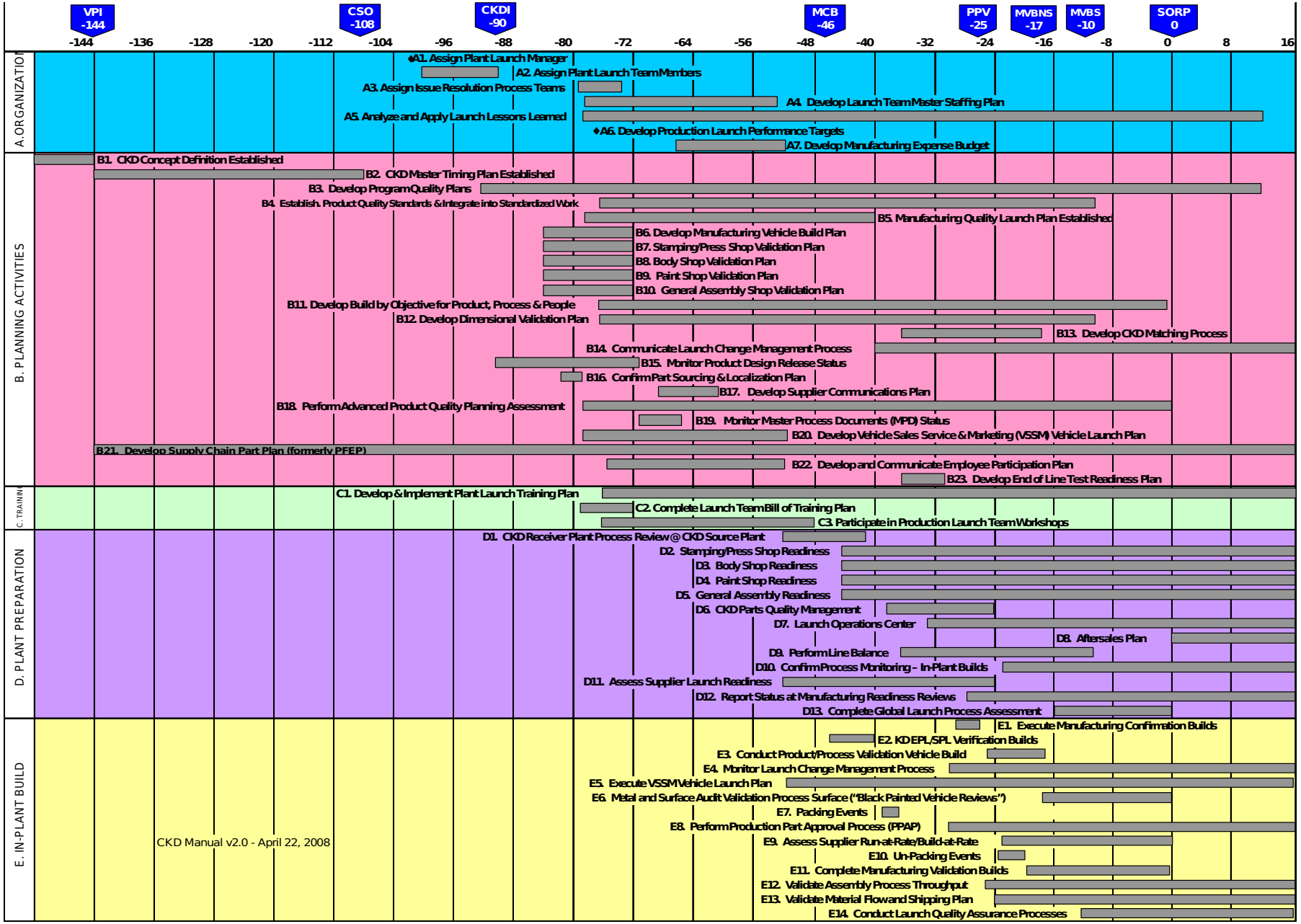
A period of time during which all Product and Process changes are managed by the Plant Launch Team. This milestone signals the transition from the Change Approval Board process to the Launch Change Approval Board process, with the usage of the Launch CAB process template.

CKD Framework

Build Chart GVDP 5.0 CKD
Global



CKD GLOBAL LAUNCH PROCESS TEMPLATE



A. Organization

A1. Assign Plant Launch Manager

Execution Responsibility: Plant Manager

Description: The *Plant* Launch Manager responsibility is assigned by the Plant Manager or appropriate level of Manufacturing Leadership . This person has authority to plan and execute the Launch Process. This may or may not be a full time responsibility at the time the assignment is made. Recent launch experience suggests that the launch manager should be someone from the plant managing the launch.

The key success factor of a production launch is an empowered Launch Manager who can plan and manage the production launch effectively. Early assignment of *Plant* Launch Manager responsibility assures in-depth planning and allocation of resources for on-target execution of launch.

The *Program* Engineering Manager (PEM) is a key partner of the PLM in the Launch Process. The PEM is an active manager in the daily function of the launch team and has the single point responsibility for the Product Engineering members assigned to the launch.

Timing: (100) weeks before Start of Regular Production (SORP)

Check List:

1. Single point responsibility/authority to plan and execute production launch is assigned.

Reference:

1. CKD Core Launch Team Template

A2. Assign Plant Launch Team Members

Execution Responsibility: *Plant* Launch Manager (CKD *Receiver* Plant) /Program *Engineering* Manager

Description: An empowered, multi-functional Production Launch Team is formed. Membership should include representatives from every staff function, which will be needed to make informed business decisions in a rapid manner It is necessary to add Aftersales Department in the core launch team. (Production core launch team typical membership GVDP) "To fully integrate existing aftersales activities into GLP (e.g., Press Shop, Plastic Shop, Body Shop, Paint, General Assembly, Quality, Facilities, Product Engineering, Industrial Engineering, Marketing, Finance, Global Sourcing, Dimensional, Powertrain and Material Supply Operations, etc).

- The resources for launch are allocated with the approval of the Plant Managerial Staff. The plant launch support team may consist of team leaders, production operators, and skilled trade support personnel, etc.
- Core Launch Team members from cross functional groups will also depend on program complexity and timing and will be expanded to a larger group of matrixed platform/plant people to support production launch until the program reaches the End of Acceleration.

The Plant Launch Manager in conjunction with the Program Engineering Manager should analyze the need for support from the source plant in order to perform a successful launch. This support should be in accordance with the program budget, and in agreement with the Source

Plant Program Manager, so it is desirable to have it defined prior to program approval. It should include trips from the receiver plant to the source plant for project buy-off and training, and also from source plant to receiver plant for installation, training, validation and issue resolution. A detailed plan should be prepared, specifying all required personnel and timing of support (staffing plan), and should also take advantage of proximity of the countries on the region that will produce the same model and stagger the launches in order to avoid duplicating the Source Plant Launch Team.

Timing: *Starts: (100) weeks before SORP- Ends: (90) weeks before SORP*

Check List:

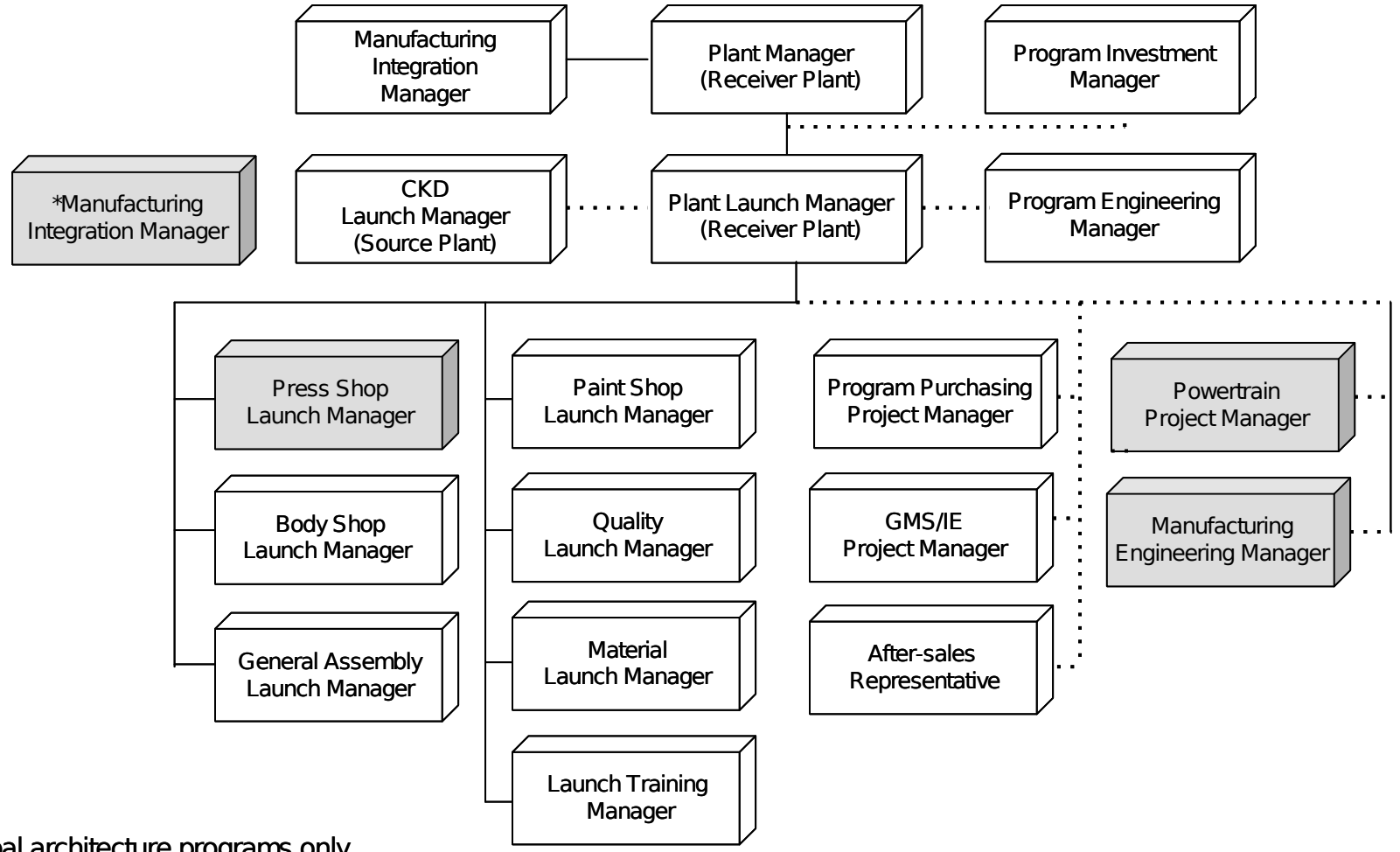
1. Determine the Aftersales Champion
2. Assure the Aftersales Team support to be part of the Launch team
3. A Production Launch Core Team from cross-functional groups (depending upon the size and complexity of the program) is assigned.
4. *Support plan should cover both ends (Source – Receiver)*
5. *Assure that support plan is in line with approved budget.*
6. *Align support plan across all plants that will produce new model.*

Reference:

1. CKD Launch Core Team Template.
2. Support plan from previous launches

CKD Core Launch Team Membership

Core Launch Team Membership – CKD



*Global architecture programs only

If required for the program

A3. Assign Issue Resolution Process Teams

Execution Responsibility: *Plant* Launch Manager/**Program Engineering Manager**

Description: Improved initial product quality is dependent upon the organization's ability to rapidly identify and correct issues found during the Integration, Product & Process Validation and Manufacturing Validation Builds. The key enabler to a successful launch and rapid issue resolution is the GM Corporate Common Seven Diamond Problem Solving Process.

The Seven Diamond Process is first initiated by the Plant Issue Teams (PIT's), who after identifying an issue, work diamonds 1 through 4 (correct process, correct tool, correct part and part to print). If the issue is not resolved in the first 4 diamonds, it is then elevated to the Issue Resolution Teams (IRT's). The IRT's work Diamonds 5 through 7 (process change, product change and hardy perennial or Red X projects) until issue resolution has been achieved.

The Launch Team must utilize the existing corporate Issue Resolution Team process. The issue resolution team membership (Plant Issue Teams & Issue Resolution Teams) needs to be identified and all linkages with other support teams and systems have to be established.

It is important to establish a link between the Change Approval Board (CAB) and the Launch Team. The CAB manages changes until the Launch Team takes over that function at week –30. The transition may vary with the program timing, but the Launch Team takes over the change management through End of Acceleration. The timing and resource support plan will be established and validated during the Launch Process Workshop. This is the best method for the Launch Team to manage change during the Manufacturing Validation Build and launch acceleration activities.

The Issue Resolution Process flowchart approved for the Global Launch Process can be found on the following page, and in Appendix J & Appendix K. The flow chart includes Plant Issue Teams, which are comprised of plant-based resources.

Plant Issue Team Leaders and Issue Resolution Team Co-Chairs must be permanently assigned to the Program and on board full time from the beginning of the Integration Vehicle Builds through the Launch Team Release (LTR). Additional support for IRT's to help remove roadblocks and ensure that issues are prioritized appropriately, can be achieved a number of ways.

The first approach includes holding a weekly Escalation meeting during the integration build phase. The Escalation meeting is intended for each IRT to review their top 5 issues and request help, if necessary. Attendance should include the Core Launch Team.

The second approach includes an IRT Champion that is assigned as an additional layer of support for each IRT team. The Champion role is generally assigned to an appropriate member (manager) of the Launch Team. The IRT Champions ensure that the IRT process is being followed. They support the IRT's by removing issue resolution roadblocks and ensuring that issues are prioritized appropriately for their respective IRT. The Champions should attend all Core Team, Launch CAB, and Wrap-Up meetings. This process is the direct link from the Launch Team to the Program Quality Escalation Process (PQEP) for issues that require higher levels of support. For more information about the PQEP process, see

Product Development Standard Work website. (Address listed in Appendix C). It is very important to have only one issues list at a given point in time for all program issues regardless of the issue source or owner. The GM common process to identify, communicate, and determine the root cause and resolve product and process issues throughout the vehicle development cycle is the Problem Resolution Tracking System (PRTS+). Both PIT & IRT members will utilize the PRTS+ process to track issues. In some situations, it may be necessary to elevate program critical issues to higher level management to provide direction and accountability to difficult issues. For these situations, the PQEP should be utilized.

GLST:
For Global Programs, an additional layer of support is established with the Global Launch Support Team (GLST). The GLST consists of up to ten members sourced from all GM Global Regions from within the Manufacturing, Product and Powertrain Engineering organizations. The main function of the GLST is to communicate issue resolution to the first four Lead Launch Plants of a Global Program. These team members will travel from Region to Region ensuring that "single set solutions" are utilized across architectural components. In some cases, single set solutions may need to be utilized among multiple Global Programs when these Programs share architectural components.

Issue Resolution Process Methodology:

The fundamental concept of the Issue Resolution Process is that issues are resolved in the build area where the issue originates.

The Plant Issue Teams (PIT) are responsible for completion of the first 4 Diamonds (Correct Process, Correct Tool, Correct Part & Part to Print) in the 7 Diamond Problem Solving Process. A specific process needs to be defined by the GLP Workshop date) as to how the Plant Issue Teams will resolve issues residing in Diamond 4 (Parts to Print). There will be a review to ensure that the agreed upon process and resources are in place for the Assembly Plant's build events.

If a qualified issue cannot be resolved within the first 4 Diamonds, the issue is escalated to the respective Issue Resolution Team (IRT) where the issue originated during assembly. This IRT is responsible for resolving the issue within Diamonds 5-7 (Process Change, Product Change and Red X Projects).

The exception to this process is with the Exterior/Closure IRT. The Exterior/Closure IRT concentrates on resolving all issues pertaining to Closures and Front & Rear-End builds. This Team has the responsibility to resolve all Closure, Fascia, Front & Rear Lamps, Grille and Front & Rear-End build issues. When PIT issues pertaining to Closures or Front & Rear-End Builds are not resolved within the first 4 Diamonds, the issue is to be elevated to the Exterior/Closure IRT for resolution. The Exterior/Closure IRT will make the determination as to whether or not an issue is to go to the Body Structure PIT for structure issues and a re-review of the first 4 Diamonds in the Body Shop assembly area.

Not every Program Launch will have an Electrical IRT. An Electrical IRT will be assigned to a Program based upon the complexity of electrical content being introduced into the product being launched. It is to be noted that if a Launch Team does not have an Electrical IRT, the Launch Team will be supported by the Plant DVT Coordinator for assistance in Test Systems or Software issues discovered within the Launch window.

The Electrical IRT will function slightly different from the other IRTs. The Electrical IRT will not have an associated Electrical Plant Issue Team (PIT) as in the case of the other IRTs. The Electrical IRT Co-Chairs will work in conjunction with the Assembly Center's electrical repairmen and the PIT or IRT that discovers, or is initially assigned an electrical issue that is related to the manufacturing assembly process (e.g. wrong harness routing, bent pins, short connector leads, etc.).

The Electrical IRT Co-Chairs will work with the Assembly Center's resources from the Assembly Verification Group (AVG) and Dynamic Vehicle Test (DVT) Coordinator when Test Systems and Software issues occur (e.g. Portable Programming Test Head (PPTH), Vehicle Audio Systems Test (VAST) or (Radio Test), Electrical Verification Unit (EVU)or (Body Test Equipment), DVT and Engine Test Unit).

Quality Assessment Process (QAP) Issue Tracking & Resolution

Issues that are discovered during the Quality Assessment Process (QAP) events are filtered down to the Launch Teams through the PQM. After a QAP event, all issues that have been identified are logged into an MS-Excel file. The file is then summarized by the PQM relative to a Warranty IPTV & JD Power Pareto and presented by the PQM to the Launch Team at a review meeting. At the review meeting, it is determined if any issues are duplicates from subsequent build events and if they are to be entered into PRTS+ for tracking and resolution. If an issue is to go to a Launch Team for investigation and resolution, the issue is entered into PRTS+ as a Launch Build PRC issue type by the appropriate personnel depending on responsibilities within the Region (IRT Co-Chair, QCE or QAP Team member). The IRT Co-Chair will then work with the appropriate PIT to determine if the issue can be resolved through the build process PRC Step (Diamonds 1-4) in PRTS+ or if it needs to be assigned to Product Engineering in the Root Cause Step of PRTS+ for a design change (Diamonds 5-7).

Captured Test Fleet (CTF) Issue Tracking & Resolution

*Issues that are identified through the Capture Test Fleet (CTF) process are filtered down to the Launch Teams through the PQM. A CTF verbatim is called into a central database (GMNA uses the *OnStar database). The verbatim are then translated and logged into a standard spreadsheet / report by the PQM/PQE. The issues natural owner then follows up with the Driver to further identify the concern. The spreadsheet / reports are then updated with the new information, and presented to a Core Team at a Weekly Verbatim Review Meeting. At the review meeting, it is determined if the issues are within the scope of the Program, if further analysis needs to be conducted on a specific issue, or if they are to be entered into PRTS+ for tracking and resolution. If an issue is to go to a Launch Team for investigation and resolution, the issue is entered into PRTS+ as a Launch Build PRC issue type by the appropriate personnel depending on responsibilities within the Region. The IRT Co-Chair will then work with the appropriate PIT to determine if the issue can be resolved through the build process PRC Step (Diamonds 1-4) in PRTS+ or if it needs to be assigned to Product Engineering in the Root Cause Step of PRTS+ for a design change (Diamonds 5-7).*

Global Launch Support Team Methodology:

The GLST methodology is to provide support to the existing Issue Resolution Team (IRT) structure by embedding resources into each IRT to perform the following tasks:

- *Provide common Manufacturing and Engineering approaches during problem solving activities*
- *Drive common issue resolution across the IRTs in various regions*
- *Provide focus and knowledge of the IRT process across regions during the build stages to:*
  - *Understand the resolution of key issues solved in your respective IRT*
  - *Ensure that solutions don't violate interbuildability and global requirements*
  - *Escalate interbuildability issues*
  - *Document the resolution and communicate to the other regions*
  - *Provide advanced knowledge on tools or assembly aids to support future plant launch execution*
  - *Capture and communicate IRT Lessons Learned*

Timing:

Staffing
Ends: (74) weeks before

IRT Process
Starts: (36) weeks before SORP - Ends: LTR

Check List:

1. Multi-functional team with authority and responsibility to track, resolve and communicate issues.
   - 1.1. Communication of build problems
   - 1.2. Issue Resolution Process
   - 1.3. Resources identified and teams established
     - 1.3.1. Identify the resources necessary to determine if parts are to the proper release specification (Diamond 4)
       - 1.3.1.1. SQE
       - 1.3.1.2. PPO / P
       - 1.3.1.3. Contrac
       - 1.3.1.4. CMM R
       - 1.3.1.5. In-hous

         manufacturers, etc.)
   - 1.4. Change communication procedures comprehended
   - 1.5. Establish and prioritize one central list of issues monitored and managed by Plant Launch Team
   - 1.6. Supplier change communications process developed
   - 1.7. Specifications support structure established
2. A central database to document and track the issues is in place
   - *2.1. Identify, pre-qualify, and enter issues into PRTS+ for tracking and resolution.*
3. *Develop meeting schedules and facilitate meetings*
   - *3.1. Plant Issue Team (PIT) Meetings (see Appendix Q)*
   - *3.2. Issue Resolution Team (IRT) Meeting (see Appendix Q)*
   - *3.3. Launch Issue Escalation Meeting (see Appendix Q)*

Reference:

1. Problem resolution and communication process
2. Problem Resolution Tracking System
3. Seven Diamond Problem Solving Process

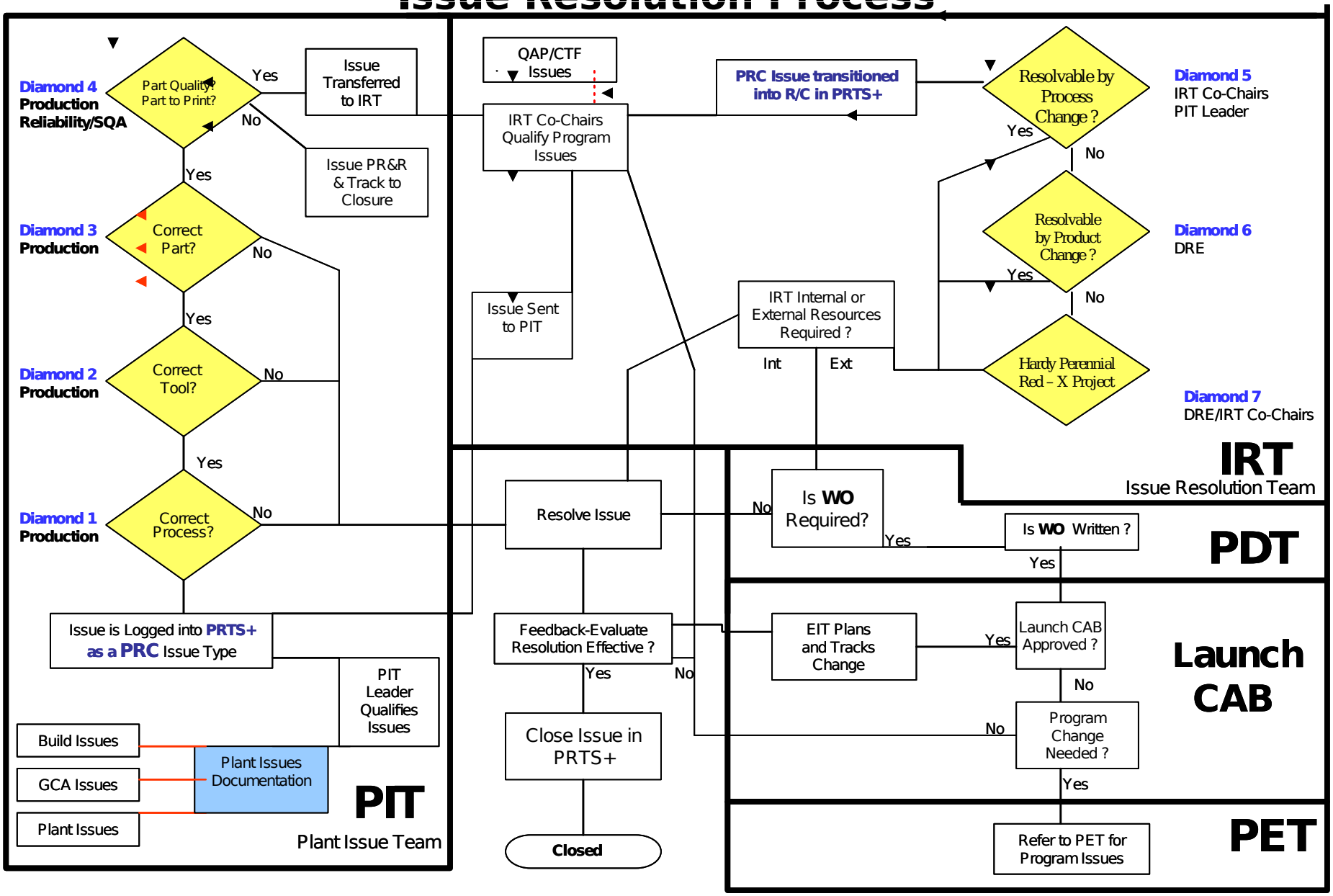
	MFG / ENG	PRODUCT
BODY STRUCTURE EXTERIOR / CLOSURES	MFG / ENG	
PAINT	MFG / ENG	
TRIM	MFG / ENG	
CHASSIS / POWERTRAIN FINAL	MFG / ENG	
SQK/RATTLE	Plan	
WINDNOISE WATER LEAKS		

IRT Co-Chairs are to be assigned to the Program and on board from the start of the Integration Builds through Launch Team Release.

** Notes:

- Consider Source Plant support personnel for IRT membership
- Template can be revised based on CKD program/plant complexity

Issue Resolution Process



The Seven Diamond Process

Plant Issue Team (PIT) - The P.I.T. process allows the Plant to do the initial investigation of a problem. This enables the departmental SME's (Subject Matter Experts) to evaluate the problem for various causes and gives the Plant the opportunity to solve any plant related problems prior to requesting help.

- The P.I.T. has responsibility for completing steps 1-4 of the Seven Diamond Process.

Issue Resolution Team (IRT) - The I.R.T. Teams take responsibility for issues passed up from the P.I.T. Teams (following completion of the first 4 diamonds) and from other sources within the program (Squeak & Rattle, Development group, etc.)

- The I.R.T. has responsibility for completing steps 5-7 of the Seven Diamond Process.

Who Leads the IRT Process?

The IRT Co-Chairs lead the IRT Process - The IRT Co-Chair positions are comprised of one Co-Chair from Manufacturing Engineering and one Co-Chair from Product Engineering.

- Exceptions: The Squeak and Rattle, Wind & Water IRT Co-Chair positions are resourced from MPG for Product and from the hosting Plant for Manufacturing. The Manufacturing Co-Chairs for Squeak and Rattle, and Wind & Water also act as the PIT Leader and are responsible for performing the initial root cause on an identified issue. They then transfer the issue to the respective PIT where the issue originated in the Plant.

Who Leads the PIT Process?

The PIT Leader leads the PIT Process - The Plant Issue Team Leader is a Team Leader / Supervisor resourced from the hosting Assembly Plant. The PIT Leader is the direct supervisor of the Subject Matter Experts (SME's) who have been Val. Center Trained in the new product line.

A4. Develop Launch Team Master Staffing Plan

Execution Responsibility: *Plant Launch Manager/Program Engineering Manager, SUP Launch Manager,*

Description: *The Plant Launch Manager, Program Engineering Manager and the Plant Launch Team member responsibilities become full time when the program requires this level of commitment. The need for full time launch team membership should not be underestimated. Most launch teams need to meet on a daily basis during the last six months prior to SORP. Movement of Launch Team membership must be kept to a minimum for the duration of the launch in order to maximize launch effectiveness. The PLM and PEM must assure the allocation of resources is managed for the duration of the launch. The best way to achieve appropriate staffing is to begin with a manpower plan.*

It is imperative that the Master Staffing Plan includes the Source Plant ME & PE support personnel, as negotiated with the source plant. These resources must be identified upfront to secure the receiver plant staffing requirements. The key to making this plan work is that the counterparts communicate resource requirement needs.

- *Plant Launch Manager (Receiver Plant) – SUP Launch Manager*
- *Local Program Engineering Manager – Original Engineering Group Manager*

As a minimum, the plan should specify:

1. *The number of staff and support personnel needed for the launch*
2. *When each of the support personnel will be needed and when they become available.*
3. *Each support person's role and responsibility for the launch.*
4. *High Risk and Integrated Suppliers that are required to be on-site during the launch*
5. *The number of hourly launch team members required to support all launch build events.*

The manpower plan should be planned in detail (by name and date) at the department level and then be consolidated into a Master Staffing Plan. Each of the functional directors will be responsible for releasing the personnel committed in the staffing plan

Timing: *Starts: (78) weeks before SORP - Ends: (52) weeks before SORP*

Check List:

1. *Assure that all the team members are assigned full time*
2. *Single point strong program management*
3. *Required resources have been specified in the Master Staffing Plan*
4. *High Risk and Integrated Suppliers*
5. *Global Launch Support Team*

Deliverable:

1. *Master Staffing Plan including consideration of check list items*

Reference:

1. *Global Launch Process functional requirements*
2. *Plant Launch Team Template*
3. *Master Staffing Plan model*
4. *Master Staffing Plan Best Practices*

A5. *Analyze & Apply* Launch Lessons Learned

Execution Responsibility: *Plant* Launch Manager/ Launch Team

Description: The *Plant* Launch Team needs to take the time and resources necessary to gather up and review all available "Launch Lessons Learned" from past new model program launches. Through appropriate utilization of these lessons, teams can effectively accelerate their learning curves.
The Production Launch Team needs to constantly capture lessons learned items from the beginning of the Launch Process to avoid the loss of valued items.
Launch teams will be expected to review and utilize the Launch Lessons Learned on a regular basis to confirm that the latest process and program decisions are comprehended. The PLM will be required to present their programs Lessons Learned at the conclusion of their launch (LTR / Final MRR Report), so the lessons can be shared with future launches to prevent similar lessons from being repeated in the future.

Timing: Starts: (78) weeks before SORP
Ends: Launch Team Release / MRR Final Launch Report
Duration: Continuous

Check List:

1. Organization
2. Planning
3. Training
4. Plant Preparation
5. In Plant Build Activities

Deliverable: Lessons Learned summaries evaluated for application on program launch

A6. Develop Production Launch Performance Targets

Execution Responsibility: *Vehicle Line Executive Team*

Description: *The Vehicle Line Executive (VLE) Team agrees on launch performance as early as Charter and should review and approve performance targets at Contract Sign-Off (CSO).*

Targets include Warranty, GCA, PPAP and *External Customer Survey*, Acceleration curve, etc. The PQRR Process and Quality Glide Paths provide the methodology to identify and monitor the quality targets throughout the GVDP. *Ensure BEC, HPV, Manufacturing Requirements / Flex Summary.*

Program Best-In-Class (BIC) launch targets will be determined by the Global Launch Council (see Appendix G BIC Template). These targets will be provided at VPI. The Global Launch Council will annually review GM and competitor's launch results in order to recommend adjustments to the targets as needed to stay competitive. For a current target, the Manufacturing Integration Manager (MIM) should contact the GLP group to obtain BIC targets.

Timing: *Starts: CSO – Ends: (90) weeks before SORP*

Check List:

1. *Program Quality targets as required by PQM.*
2. *Assure that an adequate budget forecast is identified for the development and implementation of a Launch Training Plan (LTP) for input to the program Contract Signing.*
3. *Quality targets finalized (Source: enabler #36 and Quality Glide Paths)*
   - *3.1. Incidents Per Thousand Vehicles (IPTV) (warranty 12 months)*
   - *3.2. Global Customer Audit (GCA)*
   - *3.3. Direct Run*
   - *3.4. Captured Test Fleet Plan*
   - *3.5. PPAP*
4. *Manufacturing performance targets finalized (Source: Manufacturing Requirements and MSD requirements)*
   - *4.1. Steady state performance of manufacturing system defined*
     - *4.1.1. Flexibility*
     - *4.1.2. Shift pattern*
     - *4.1.3. Throughput (Jobs Per Hour [JPH])*
     - *4.1.4. Uptime*
     - *4.1.5. Actual Launch Training hours versus Launch Training Plan (LTP) hours*
5. *Acceleration performance targets finalized*
   - *5.1. Duration*
   - *5.2. % Volume (New Model)*
6. *Identify expected differences in the program specific launch plan to the Launch Process Template*

Deliverable: *Launch Targets defined and risk assessment performed.*
Plans to achieve targets are bought-off

Reference:

1. *Global Metrics*
2. *Launch Training Plan (Element C1)*
3. *Best-in-Class Targets (Appendix G)*

A7. Develop Manufacturing Expense Budget

Execution Responsibility: *Program Investment Manager, Manufacturing Integration Manager, Plant Launch Manager, Assembly Plant Comptroller*

Description: *The Manufacturing Pre-Production Expense budget is developed for each of the calendar years in a program's Vehicle Development Process. The Manufacturing Integration Manager (MIM), Plant Launch Manager (PLM) and Program Investment Manager (PIM) all participate in the development of Manufacturing Pre-Production Expense budget. The MIM is responsible for the Pre-Production budget from Vehicle Program Initiation (VPI) through week -100. The PLM is responsible for the Pre-Production budget from -100 weeks through Launch Team Release (LTR). This activity applies to all vehicle programs classified as new or major and that are greater than a MCE 3. Some MCE 3 programs may be included based on the decision of the Program Manufacturing Management staff.*

The MIM, PLM, PIM and Assembly Plant Controller will coordinate the Manufacturing Pre-Production Budget Planning Process.

- *Manufacturing Pre-Production Expense Template*
- *Budget Worksheet*

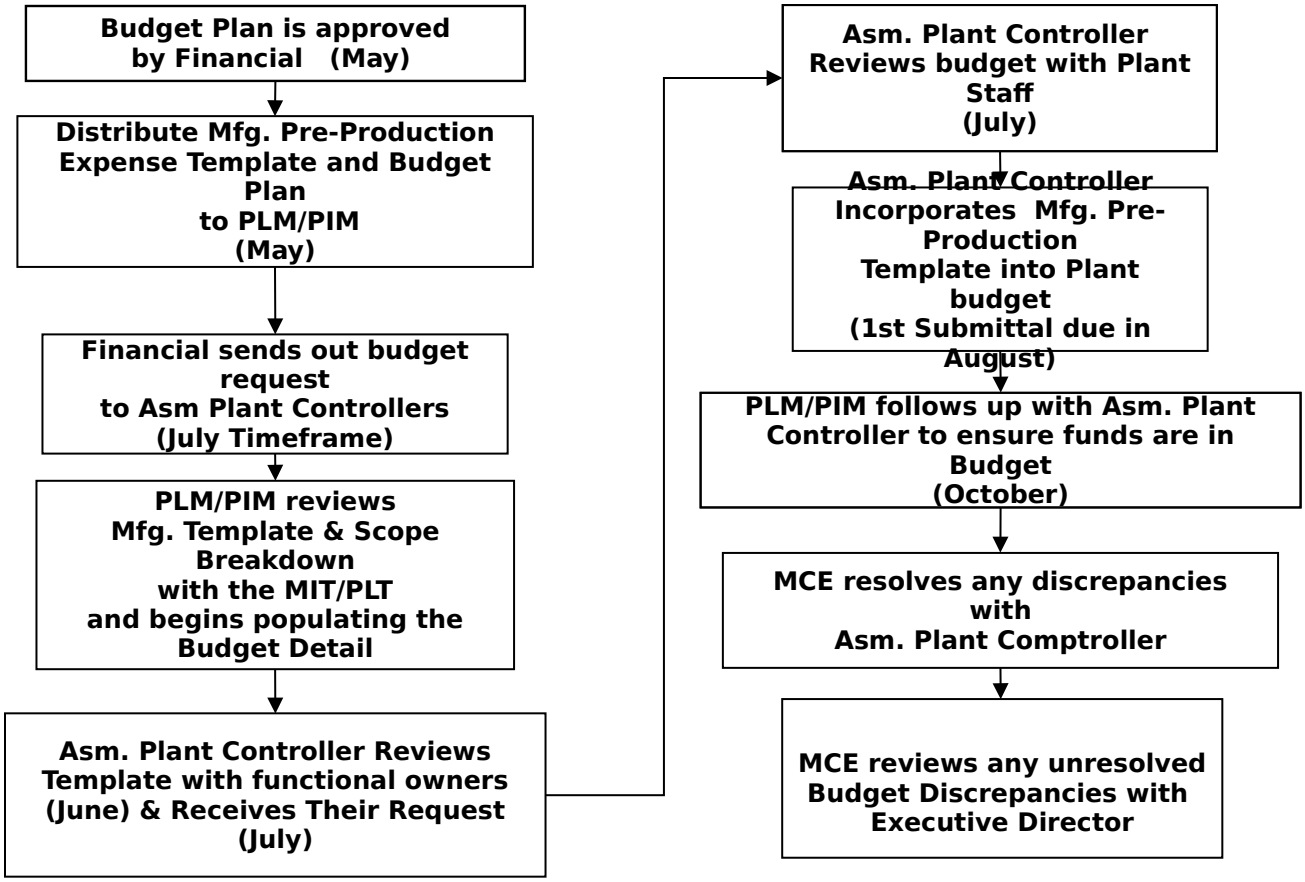
<u>Discussion on Application of Manufacturing Pre-Production Expense Template</u>
The MIM, PLM, or PIM will contact the Assembly Plant Controller for content input into the <u>Manufacturing Pre-Production Expense Template</u>.

Discussion on the application of the "Manufacturing Pre-Production Expense Template" can be lead by either the MIM, PLM, or Program Investment Manager as to the elements and conversion into United States dollar ($) values for the worksheet.

Create the Program Specific Budget Worksheet
Jointly the MIM, PLM, and Program Investment Manager with the Assembly Plant Controller will agree on the content of the Manufacturing Pre-Production Expense Budget. They will convert into United States dollar ($) values and fill out the budget to the common worksheet for the specific program by using the Manufacturing Pre-Production Expense Template's macro. These Pre-production and Startup Budget expenses are not covered in the Project.

Budget Approval
On completion, the Assembly Plant Controller, MIM, PLM, and Program Investment Manager will obtain the Assembly Plant and (Global)/Mfg Chief Engineer (MCE) approval for the specific program. The MCE will elevate any concerns to the Program Execution Team.

Process Flow:



Timing: *This activity timing must be initiated based on calendar timing.*
Starts: May to June (Calendar Based)
Ends: December

Deliverables:

1. *Completed Manufacturing Pre-Production Expense Forecast*

Reference:

1. *Manufacturing Pre-production Expense Template*
2. *GLP MCE3/Annual Website (see website location in Appendix C)*

B. Planning

B1. CKD Concept Definition Established

Execution Responsibility: CKD VLE Team/*Program Manufacturing Integration Manager*

Description: In progress of doing CKD business with overseas CKD customers, the first thing to be prioritized to lead the program successfully is to define what the concept of the program is. The purpose of defining it is to figure out what the customers' requirements are and verify whether CKD Source Plant has an adequate budget to meet their requirement and a capacity to provide the resources. Without defining the project concept, the program could be endangered from the initial stage because there is no way to perceive resources or risk internally and externally.

This should be done as an exit criteria for VPI. The essential elements of CKD concept could be divided into several things which are the following:

1. Project Volume
2. Project Description
3. *Specific "In-Country" Product Requirements*
4. Localization plan
5. Market Analysis including price positioning and competitive price with competitors
6. Manufacturing System concept
7. Budget and Capacity Constraint Check, etc.

For validating the CKD concept, both parties need to check whether the project is on track through confirming the check list such as the followings :

Timing: *Starts: pre-DSI – Ends: @VPI (week -144 to SORP)*

Check List:

1. Master timing plan consistent with *source plant* and Customer's VDP
2. Product program imperatives defined
3. Acceptable financial impact
4. No incremental resources / investment and budget impact
5. No supply constraints to meet timing plan
6. RASI is defined and based on customer's requirement (PE)
7. No critical issue for master timing plan (ME)
8. No critical capacity constraint
9. Coordinated with CBU plan

B2. CKD Master Timing Plan Established

Execution Responsibility: Project Manager – CKD Source Plant
Manufacturing Chief Engineer (MCE) – CKD Receiver Plant

Description: Based upon the PPC (Product program content) and PPS (Product Program Submission), the specific master timing is developed.
Detailed Master timing plan describes all project implement events and timing for all involved area from the official Approval to 3 months after SORP.(e.g. Implementing Event and timing of business approval and Product engineering area, sample supply, ,technical material including ME and QD, KD, Supervision, Securing plant manpower , Manufacturing facilities of Press shop, Body , Paint , GA, Material handling , CKD parts

supply , Localization support, etc) Both CKD Source and Receive Plant project manager should develop and maintain the Master timing plan to ensure required implement timing of each area without discordance between Receiver and Source plant.

The development and update of Master timing plan will be done in a regular joint work shop. The result of work shop will be approved by project management (VLE level) of both Plants. It takes effect on further program.

The benefits of Master timing assessment are as follows

- Provides same implement description and timing chart to both Launching team:
  - Project regular meeting
  - Technical material supply
  - Supervision
  - Manufacturing facility schedule
  - Launching plan
  - Training plan
- Continuous checking the progress by both Project manager
- Provide the project status for management decision
- Enables the continuous update of Program timing of each area

Timing: *Starts: VPI (-144 weeks to SORP) - Ends: CSO (-108 weeks to SORP)*

Check List:

1. Program *Product* Contents
2. Program *Product* Submission
3. Product Engineering Release schedule
4. Facility preparation plan
   4.1. Press shop Plan (Die tooling)
   4.2. Body shop facility Plan (Jig , Welding equipment etc)
   4.3. Work scheduling
   4.4. Paint , GA , QD shop Plan
5. CKD Parts Plan */ Localization Strategy*
6. Quality launch support plan
7. Supervision plan of each area

Reference:

1. Master timing chart Template

B3. Develop Program Quality Plans

Execution Responsibility: *Program Quality Manager*

Description:

Program Quality Readiness Reviews (PQRR's)

The PQRR process is a series of high level reviews throughout the vehicle development process. The purpose for the reviews is to verify that critical to quality and critical to readiness deliverables/elements have been completed. The PQRR process assures that all late deliverables have appropriate 5-Phases/countermeasures in place, and that the deliverable/element will be met with integrity and will not affect program timing. The reviews will be based on the GVDP timing models for the Integration Builds, the Product/Process Validation Builds, the Manufacturing Validation Non-Saleable Builds, the Manufacturing Validation Saleable Builds, Start of Regular Production, and Ship to Commerce.

The Launch Team Release (LTR) Review is the final decision point to release the Launch Team resources from the assembly plant and to begin

using the Continuous Product Improvement Process (CPIP). This is a decision that is made by the plant manager and depends on the status of the launch at that time. All recovery plans are reviewed and a risk assessment of program imperatives completed. The Core Launch Team will facilitate the Launch Team Release meeting.

Timing: *PQRR's conducted with timing of the following events:*

PQRR Event	*Week*
CKD Initiation	*-92*
CKD Health Check	*-43*
Product/Process Validation	*-26*
Manufacturing Validation Non-Saleable	*-18*
Manufacturing Validation Saleable	*-12*
Production	*0*
Ship to Commerce	*+1*
Launch Team Release	*+12*

Specific program timing for all PQRR events can be found at the Global Program Quality Readiness Review website. PD Quality (see website location in Appendix C).

Check List:

1. *Schedule PQRR*
2. *Launch Team Release PQRR*
   - *2.1 Vehicle Quality Review*
   - *2.2 Vehicle Audit Review*
   - *2.3 Part Status*
   - *2.4 Engineering Open Issues*
   - *2.5 GMPT Readiness*
   - *2.6 Metal Readiness*
   - *2.7 Assembly Process Readiness*
   - *2.8 Sequencer/Sub-Assembler*
   - *2.9 PQRR Decision*
   - *2.10 "As-Built" Layouts completed/Layout Status*
   - *2.11 Plant Manager will make final decision*

Reference:

1. *GVDP major milestone events*
2. *PQRR Review Process*

Description:

Captured Test Fleet (CTF)

Captured Test Fleet vehicles are a subset of the Manufacturing Validation Build (MVB-S). They are built as part of the first Saleable units in the assembly plant. They are in addition to the vehicles ordered by Engineering, Marketing, International Product Center, and other internal GM customers. Even though CTF vehicles may be diverted for QA testing or executive evaluation, most are built for Product Evaluation Program (PEP) Service. In that capacity GM Company car drivers and employees provide early identification of unknown problems through the accumulation of typical customer mileage in support of the Ship-to-Commerce (STC) decision.

All MVB-S vehicles must be tracked and retrofitted before being sold. This includes vehicles shipped to internal GM customers as well as any unassigned dealer orders used to fill out the MVB-S build event and held at the plant until STC.

There are very limited situations when a Non-Saleable Manufacturing Validation unit is built specifically for "CTF evaluation and mileage accumulation". If this is the case, then ALL safety and certification

requirements must be met. The issues defining non-salability should be related to part graining, metal fit / finish etc.

Timing: *Planning:*
Starts: @CKDI (-90 weeks to SORP)
Execution:
Starts: (10) Weeks before SORP - Ends: EOA

Statement of Intent: *All MVB-S vehicles, including CTF, are saleable vehicles built with no known retrofits or "PPAP Non-Saleable" parts. Any deviations will require Operations Officer's "deep dive" and decision around specific exceptions.*

Quantities: *Based on Program complexity and need for in-country mileage accumulation*

Build Timing: *CTF vehicles should be sequenced early in the builds but spread across all the MVB-S bucket build events. Consideration should be given to long lead marketing needs, engineering and validation testing, as well as ample time for mileage accumulation, and the opportunity to verify fixes.*

Shipping: *Shipment of saleable vehicles to internal customers prior to the decision to Ship to Commerce requires written approval from the Program Quality Manager.*

Retrofits: *The Program Quality Manager in close cooperation with the Launch Team is responsible to generate the Retrofit List (item by item) to be finalized and retrofit worksheets submitted to CTF Group at the STC PQRR. This list must cover a review of all MVB saleable issues including any PPAP "Non-saleable" parts. MVB-S vehicles ordered by and shipped to internal GM customers are designated by WD0/WD1. Holds are generated on those vehicles until retrofit are completed.*

Check List:

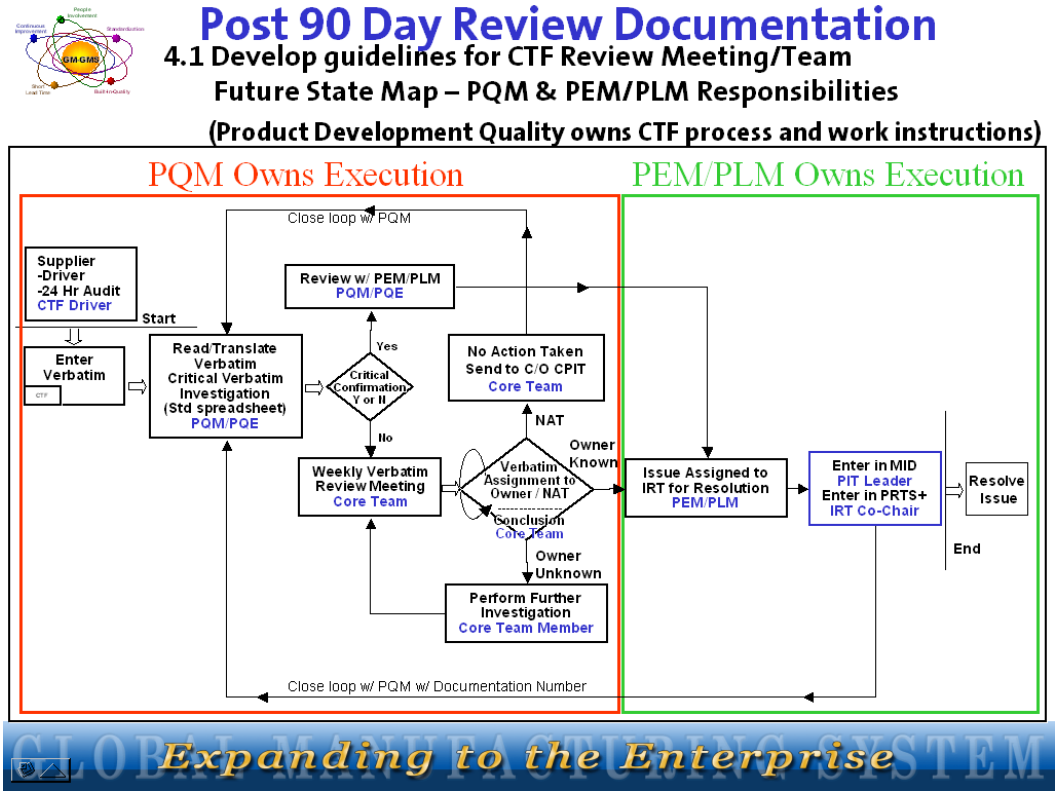
1. *Manufacturing Validation Builds*
   - *1.1. Identify number of Captured Test Fleet Vehicles to produce Identify combinations of CTF Vehicles*
   - *1.2. Identify buckets for the CTF Vehicles*
   - *1.3. No known retrofits or PPAP "Non-Saleable" level parts*
   - *1.4. 1.5 Execute plan for local expedited shipping – 24 to 48 hours (checklist item 4).*
2. *Retrofits*
   - *2.1. Vehicles shipped by the plant prior to STC per the direction of the PQM will be retrofitted by CTF group.*
   - *2.2. Vehicles required for "Manufacturing Learning and Validation" (including pull-a-head, "duped", or unassigned dealer orders) that are held at the plant until STC will be retrofitted by the respective assembly plant.*
   - *2.3. MVB-S vehicles are produced to salable levels, at the time of the build.*
   - *2.4. There is no intent to upgrade MVB-S vehicles to current level of detail.*
   - *2.5. The Program Quality Manager is the Single Voice approval for retrofits*
   - *2.6. Issues of Safety / Compliance are corrected*
   - *2.7. Functional inoperative vehicles should be corrected*
   - *2.8. Damage during assignment is usually covered through ESIS report*
3. *Orders*
   - *3.1. Content of CTF orders is determined by the PQM.*

3.2. *Orders not yet released to the plant should be changed by MVB Order Group.*
3.3. *Once orders are released, the assembly plant is responsible for making changes*
3.4. *PQM should be involved in any changes to CTF vehicles (e.g.) diverting PEP orders to engineering or Engineering vehicles to Marketing etc.*

4. *Shipping of CTF vehicles*
   4.1. *CTF vehicles are to be shipped by the carrier within 2 weeks of being produced and it is expected that this timing will improve as the build progresses*
   4.2. *CTF vehicles should be shipped by truck via the most direct route to the designated CVO regions (mostly SE Michigan).*
   4.3. *Logistics should be engaged and supportive to expedite 24-48 hour delivery.*
   4.4. *Program Quality Manager written approval to ship specific vehicles to specific customers prior to STC.*
5. *Issue Resolution*
   5.1. *Follow CTF issue resolution flow chart*

Reference:

1. *Captured Test Fleet ISO Procedures*
   1.1. QS-7.3-W-PQ0005, PQ0006, PQ0007, PQ0008, PQ0009, PQ0010
2. *GM PQRR Process*
3. *Best practice template for CTF overview*
4. *CTF Problem Solving – Issue Resolution Flow Chart*
5. *Assembly Plant Procedure: QS-02-P-APP02*
6. *Global Quality Plan C7 (See Appendix C for website)*



Quality Assessment Process (QAP)
Description:

The Quality Assessment Process (QAP) is used to evaluate if a program in on track to its Quality business plan goals, e.g. Warranty *IPTV or a regional customer metric such as* J. D. Power *IQS3 Track Study PPH* .

“Initial quality” issues are identified that would be found by retail customers *in the* areas of:

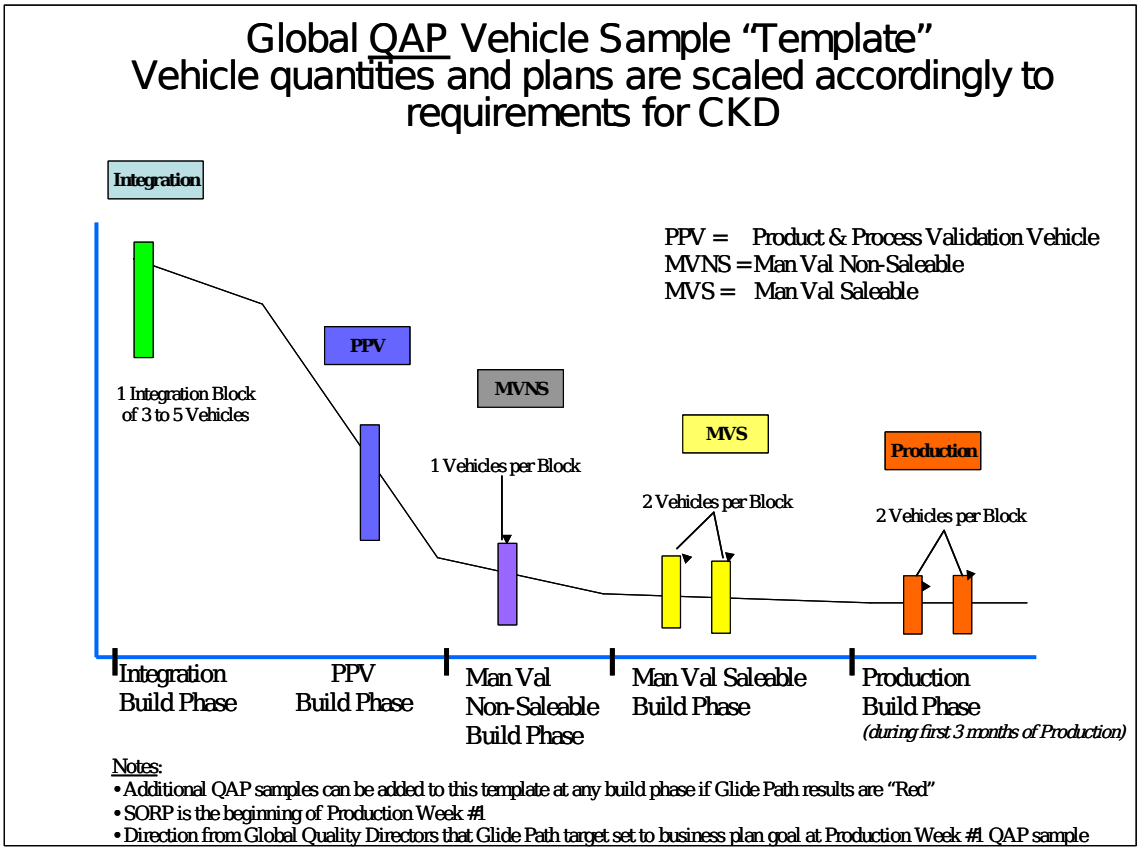
- Dynamic evaluations on a wide range of road surfaces
- Accessory functions (e.g. power window switches)
- Static “fit and appearance”

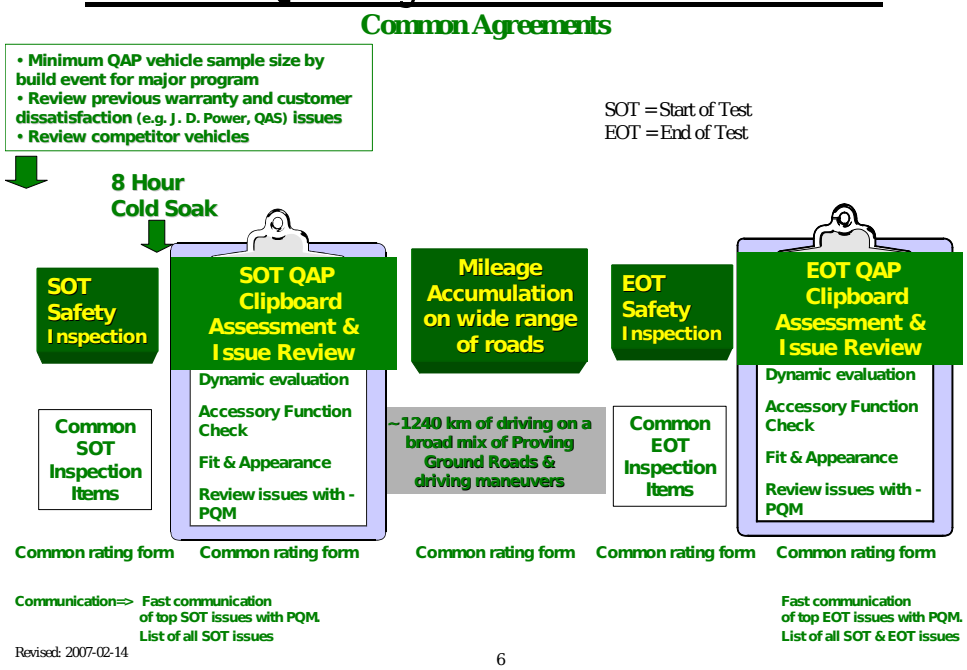
Issue severity (4, 6, or 8) identified for corrective action.

Warranty customer dissatisfaction *(e.g. J.D. Power)* issues are also identified.

Top issues are communicated to the program teams immediately after the test. A MS-Excel file is provided to the program team of all *QAP* issues found.

Vehicle quantities and plans are scaled accordingly to requirements for CKD.





Timing: *Planning:*

Starts: (90) weeks to SORP
Execution:
QAP Starts: (48) weeks to SORP, with the development of the initial glidepath plan.
QAP samples begin with Integration builds and can continue 3 months after SORP.

Check List:

1. *Select vehicles for QAP. Vehicles must be representative of all vehicles in build phase*
   - *1.1. No special process/reviews for QA properties, no additional finesse, representative option content*
   - *1.2. starting odometer mileage must not exceed new vehicle requirements (In U. S. starting odometer miles ≤ 100 miles)*
   - *1.3. Must meet all Proving Ground Safety requirements*
   - *1.4. Must be represent*
2. *Conduct QAP SOT Safety Inspection – similar to GM dealership inspection*
   - *2.1. Check for shipping damage*
   - *2.2. Check fluid levels and diagnostic codes*
   - *2.3. Install loose parts shipped with the vehicle*
3. *Ship vehicles to Proving Grounds.*
4. *Sound and expedient process in place that guarantees the timely receipt and delivery of vehicles within a 3-day time frame. (Reference Appendix M)*

B4. Establish Product Quality Standards & Integrate into Standardized Work

Execution Responsibility: *Quality Launch Manager / Plant Launch Manager*

Description: *Product Quality Standards (PQS) should be developed by Quality group during the Integration build event in a "draft" format. These standards are applicable to all Vehicle Assembly production and inspection workstations. The standards should clearly communicate a condition, dimension or value that must be achieved to satisfy the customer. Product Quality Standards at a minimum should cover Minimum Care Line Content, voice of the customer, design requirements, engineering requirements & processing requirements in order to provide the production team member with the required information to build a quality product and provide the Inspection team member the ability to verify that the work meets standards.*

Product Quality standards should be shop-floor friendly and easy to understand. They should support the judgment / decision making process for inspection and production team members.

Product Quality Standards should be used as an input to Inspection and Production JES. For training purposes during PPV & MVBns, the Product Quality Standards should be available in a draft format to the team member and included in the operation book. The PQS should be incorporated in the operation and quality team member JES.

Evaluate product and process capability to meet quality standards (PQS). Build issues are entered into the Problem Solving Process and assigned to appropriate owners:

- *Engineering*
- *Production*
- *Suppliers*

The draft PQS documents are refined during the integration and manufacturing validation builds in order to develop a validated standard.

Plants demonstrate their ability to meet the PQS. In cases where the plant is not capable, production pursues corrective actions and may request a temporary standard. In these situations, there must be clear start and end dates along with an action plan to meet the permanent standard.

Timing: *Starts: (76) weeks before SORP - Ends: End of MVBns*

Check List:

1. *Product Quality Standards complete*
2. *Appropriate resources assigned (QE's if staffed)*
3. *QS reviewed by Production & Quality*
4. *QS approved by Quality*
5. *PQS referenced in applicable Inspection & Production JES*
6. *Change control process documented*
7. *Database established*
8. *Common database used for platform builds*

Reference:

1. *Quality Launch Template*
2. *Plant Launch Template*
3. *Program Manufacturing Validation Plan*
4. *Quality Glide Path*
5. *Common Quality Launch Training Process*
6. *Launch Training Plan (element C1)*

B5. Manufacturing Quality Launch Plan Established

Execution Responsibility: Quality Launch Manager

Description: Based upon the Quality Launch Process and GLP Templates, the program specific Manufacturing Quality Launch Plan is developed.

The Quality Website (see appendix C) contains the Quality Template. Every program will require adjustment to timing based on the program complexity and the need to integrate the quality launch activities with other program activities and timing.

The activities identified in the template need to be included in the program specific plan, regardless of the complexity of the program. Further, the only differences between the plan and the templates are expected to be issues of timing and activity scope. In many cases, the program may require additional activities to cover complexity and site-specific situations.

The development of the plan will be done in a workshop format prior to the GLP Workshop. The result of the workshop will be a detailed and validated Quality Launch Plan. *This plan will include the current status (using Master Dot) of each element of the Quality Launch Plan Template.*

As part of the Quality Launch Planning and execution process the Quality launch team will participate in three Manufacturing Quality Readiness Reviews conducted by Central Quality. The timing of the reviews is typically -60 to -40, -30 to -20 & -15 to -8. weeks .

Timing: Starts: (*78*) weeks before SORP - Ends: (*40*) weeks before SORP

Check List:

1. Quality Launch Plan developed using the appropriate Template to coincide with the Production Launch Plan Template to include all Quality Launch Manager Deliverables.
2. Facility preparation plan
   2.1. Assembly plant facility plan
   2.2. Plant layouts
   2.3. Work scheduling
   2.4. Safety, health and environmental issues
3. Data/System integration plan
4. Known part restrictions and stop orders
5. Batch and Hold Process Implemented at Assembly Plant
6. Expedited shipping process for QAP vehicles
7. *Vehicle mutilation protection available and utilized*

Reference:

1. Quality Launch Template
2. Production Launch Template
3. Program Manufacturing Validation Plan
4. PQRR Process
5. Quality Glide Path
6. Common Quality Launch Training Process
7. *Launch Training Plan*
8. *Welding System Qualification Plan (see Appendix C)*
9. *BIW Manufacturing Validation Standard (MV-1) (see Appendix C)*

B6. Develop Manufacturing Vehicle Build Plan

Execution Responsibility: *Plant* Launch Manager with Production Launch Team

Description: *This plan is to include a build plan covering manpower, material, equipment and timing for all program vehicles to be built in-plant (MCB, PPV, MVBns and MVBs).* The plan describes *in-plant build* events through acceleration (e.g., number of vehicles, powertrain combinations, part requirements, timing, location, key tryout events, body systems requirements including sheet metal/polymers/paint, and acceleration for GA, Paint, and Body Shop).

PPV and Manufacturing Validation Builds (MVB) form the process that builds vehicles on-line in the Assembly Plant prior to the Start of Regular Production (SORP) in order to validate the manufacturing systems, train operators, and to identify and resolve process issues. This includes production of PPV, Non-Saleable and Saleable vehicles. Saleable vehicles are defined as vehicles, which meet all design, regulatory, safety and customer requirements. Non-Saleable vehicles may not meet these requirements in some respects.

Adherence to the use of common GLP templates are key for successful launches globally and synergy between the Plant Launch Teams, facilitating program implementation within a cadence in different countries all around the world (Act as "One Company").

The purpose of Manufacturing Validation Builds is to:

- Validate the Manufacturing and Assembly Plant process
- Prepare the plant for an efficient and quality acceleration
- Demonstrate capability to produce vehicles
  - To design intent
  - At line rate
  - Meet business plan quality levels
  - Ready to start system fill (SSF)

- Provide product and process exposure to the Assembly Plant to provide training repetition to the operator
- Validate during MVB the following:
  - Tool and facility changes
  - Plan for every part
  - Material flow
  - Containerization
  - Plant systems
  - IS&S Bill of IT systems
  - Overall Plant readiness

Note: MVB is a Manufacturing Event. It is NOT a Product Design Validation Event.

To meet these objectives, the Plant Launch Team will hold an MVB workshop to integrate all build requirements into one consolidated Manufacturing Validation Build Plan. The plan should satisfy all the functional area needs for validation and operator training while meeting customer requirements, considering that:

- The MVB program will start on time
- All MVB Saleable vehicles will meet saleable requirements
- PPV/MVB vehicles will be built online with the tools, equipment, material delivery and assist devices installed as planned for start-up
- All PPV / MVB vehicles must achieve pre-established quality levels for GCA (Squeak & Rattle, Water leaks, etc.) Direct Run, and Warranty Glide Path
- Shipment dates of completed vehicles will comply with the Owner's required delivery dates. The vehicles will be shipped using the normal shipping modes except in extreme situations.
- All plant systems will be tried-out and validated UAT during MVB (Andon, EPS, Plant Floor Monitoring, production ordering systems, etc.)
  - *All non-UAT error proofing operations must have containment plans in place until the UATs are complete. (i.e. 100% torque confirmation for torque tools as required by control plans, additional visual confirmation for part-pick)*
- Plant resources and processes are ready to start SSF. IS&S Operations contract in place
- Bucket build strategy will be used
- A Minimum of a 1 hour department wide run at full rate is needed for system validation. (Preferably a 4-hour run)

The Launch Team will determine the number of build buckets and the quantities in each bucket. It is essential that MVB plans are coordinated with the Global Production Launch Group to ensure that the plan provides an appropriate number of vehicles for each bucket. The launch team should develop and utilize a Build-By-Objective plan that ensures the required level of process development without incurring unnecessary cost and timing. Each MRD is 10 calendar days before the build. The build plan should include detailed plans for completing manufacturing validation builds (MVB) in every area of the plant (Sheet Metal, Powertrain, Body Shop, Paint, and General Assembly). These MVB plans also need to be coordinated. The plan should include expedited, early delivery of MVB-Non Saleable vehicles to Powertrain Engineering, for purposes of verifying the calibration on MVB vehicles. The plan must define how material is going to be managed for the MVB process. It is intended that PPV/MVB material will be ordered through the normal production material ordering process. PPAP non-approved parts will be ordered by ASQR at GME.

The vehicles should be built online by the production operators. The time intervals between the buckets should be used to develop and implement

solutions to outstanding problems. The organization should focus on achieving saleability as early as possible. Every effort should be made to provide the latest engineering change level at the highest part quality to ensure vehicle saleability as soon as possible.

Not all problems can be resolved and implemented in the time period between consecutive buckets. Therefore, it is important that the program implement a good scheduling system for managing problem resolutions and scheduling the solutions into downstream buckets for validation. If retrofits are required to achieve saleability of these vehicles it is important that the program have a good tracking system for knowing what post-build retrofits need to happen to each vehicle by VIN.

All parts and assemblies, (for Non-saleable Build Buckets), which are not dimensionally correct, shall be accompanied with documentation showing, in detail, the dimensional characteristics of the part/assemblies. The purpose of this requirement is to aid in root-cause problem-solving.

The Program Planning Manager, working through the PET and actively supported by the Manufacturing Program Management organization, should have ensured that a customer has been identified for each MVB unit by the Verified Data Release (VDR), Program Quality Readiness Review (PQRR). Additionally, any change to the MVB Plan or impact to the customer commitments must be taken to the PET for resolution and review. Since the FMA MVB Order Team has the responsibility for processing order changes they should be involved in the reviews. All changes to the MVB Plan must be communicated to the Regional Global Launch Process Advisor.

The Acceleration plan must be perfectly aligned with VSSM and GPSC Launch Plans in order to guarantee that the forecast reflects not only marketing, but also manufacturing necessities. Moreover, this alignment ought to be performed at least 12 weeks prior to the SOA, as per GPSC request, to ensure that the forecast really reflects program launch necessities.

The Launch Team must ensure that the vehicle build plan for the acceleration period does not exceed the maximum tooling capacity rates, which have been previously established for the program. If the team feels it is necessary to exceed these rates, a business case must be developed and approved by the VLE Team in order to obtain the necessary funding. The build plan must also comprehend maintenance readiness.

Timing: Starts: (76) weeks before SORP – Ends: (74) weeks before SORP

Check List:

1. Manufacturing Validation Build plan
    1.1. Vehicle build start dates
    1.2. Bucket build plan
    1.3. Material release date
    1.4. Sheet metal plan
    1.5. Include additional metal finish rework/retrofit requirements in order to plan the early MVB gapping strategy
    1.6. Powertrain plan
    1.7. Body Shop plan
    1.8. Paint plan
    1.9. General Assembly plan
    1.10. Quality System plan
    1.11. Complexity Risk Analysis
2. Vehicle scheduling
    2.1. # of vehicles

2.2. Build combinations
2.3. Bucket build plan including material required dates (MRD)
2.4. Option content
2.5. Colors
2.6. Export vehicle build plans
2.7. Verify that the vehicle build plan does not exceed maximum tooling capacity for options, models, and body styles
2.8. Provisions to expedite delivery of MVB-NS vehicles to Powertrain engineering for calibration verification

3. On-line build tear down plan
   3.1. # of vehicles
   3.2. Tear down plan
   3.3. Tear down usage
   3.4. Repair Parts Ordering
4. Plan for volumes required for build out of the old parts for service parts and new parts
5. Material plan
   5.1. Material coordinator assigned
   5.2. Incoming material documentation
   5.3. Hand-carried material verification
   5.4. Unmarked material identification
   5.5. Replacement of lost, damaged, or wrong material
   5.6. Material storage plan
      5.6.1. Cribs
      5.6.2. Inventory control
      5.6.3. Logbook for material removal (Tooling, Reliability, Production, Engineering, etc.)
      5.6.4. Crib coordinator
      5.6.5. Material kits
         5.6.5.1. Development
         5.6.5.2. Routing (delivery points)
         5.6.5.3. Verification of material in kits upon arrival and prior to Manufacturing Validation Builds
         5.6.5.4. Follow-up on shortages and secure required parts prior to Manufacturing Validation Build
         5.6.5.5. Material status reports
         5.6.5.6. Parts shortage list by vehicle
         5.6.5.7. Retrofit material
   5.7. Customs requirements identified for shipping equipment and Materials across international borders
6. Material readiness for vehicle build plan
   6.1. Material shortage review meetings/action
   6.2. Engineering changes status/close out
   6.3. Plant quality plans (PPAP status)
   6.4. Material availability verified
   6.5. Parts lists verified/revised
   6.6. Material presentation/lay-outs
   6.7. New material marshaling plan
   6.8. New material parts identification plan
   6.9. Packaging plan to support build bucket schedule (varied quantities)
   6.10. Indirect material status
      6.10.1. New tools added
      6.10.2. Deletion of obsolete tools
   6.11. Plan to breakpoint material to support multiple MRD’s
7. *Quality Plan*
   7.1. Quality confirmation plans for Weld, torque, routing & mandatory sequence and includes confirmation of general process equipment(e.g. fluid fills, glazing, etc.)

7.2. Data collection & reporting plan for all quality metrics
7.3. Weld quality validation plan using 6-Event destruct Model (ref WS-4A, see Appendix C)
7.4. Quality Audit plan for GCA, water-test, S&R, BLT, etc.
7.5. Product Quality Standard validation
7.6. Batch & Hold trial
7.7. Quality Containment plan

8. Accounting procedures
   8.1. Work orders
   8.2. Account numbers
   8.3. Approval procedure
9. Safety compliance verification plan
   9.1. Chemical/Physical safety plan
   9.2. Material Safety Data Sheets
   9.3. Safe use instructions
   9.4. Hazardous waste items disposal plan
   9.5. Safe job instructions
   9.6. Hazardous material training
   9.7. Visitor Safety Training
10. Discrepant material process plan established
   10.1. Team review process
   10.2. Use of tags
   10.3. Review across crews
11. Manufacturing Validation Builds vehicle build accounting procedures
   11.1. Work orders
   11.2. Account numbers
   11.3. Approval procedure
   11.4. Tracking
12. Issue Resolution Procedure
   12.1. Identification and Documentation of launch issues
   12.2. Communication of launch issues
   12.3. Issue escalation process
   12.4. Product/Process change communication procedure
   12.5. Engineering information communication plan.
13. Communication of program content to the plant(s).
   13.1. Program content documented
   13.2. Meeting attendees identified
   13.3. Meeting scheduled
14. Launch Training Plan (LTP) implementation (element C1) in place
15. MVB Requirements
   15.1. Dimensionally correct part off production tools available for Manufacturing Validation Builds.
   15.2. Bucket builds planned/supported by the appropriate resources.
   15.3. Order Flow Plan (Order Fulfillment) ready at week –26
   15.4. Reconfirm and execute the Order Flow Plan
   15.5. Make sure MVB-NS and MVB-S orders have correct content.
   15.6. Match Marketing ordering guides to build combinations/content (manual check).
   15.7. Make sure Vehicle Description Summary matches Product Program Content.
   15.8. Objectives and intended learning established by buckets.
   15.9. Tracking system in place to track individual vehicles by VIN
   15.10. Facilities, tools and equipment in place to support activity
   15.11. Issue resolution and change management in place
   15.12. Complete all requirements for PQRR (MVB) Compile list and order replacement parts for each MRD in the MVB Plan.
   15.13. Review Color Harmony plan, timing & requirements

Reference:

1. Manufacturing Validation Build Details (numbers/events/schedules)
2. Acceleration information from Contract Signing
3. Process Verification Build Process
4. Material Readiness Process
5. Order Flow Plan

B7. Stamping/Press Shop Validation Plan

Execution Responsibility: *Metal Fabrication Launch Manager / Press Shop Launch Manager, PLM*

Description: *The Metal Fabrication Launch Manager is responsible for e the development of the Stamping / Press shop Validation Plan. This plan should include all plans to validate the systems and process to ensure that parts will be available to support the PPV/Manufacturing Validation Build Material Required Dates. Additionally, these plans need to support both the Matching and Dimensional execution elements.*

The Stamping / Press Shop Validation Plan needs to specify the metal submission requirements for each metal delivery point defined in the program progression. Downstream customers knowing the timing, quantity and part quality of the metal products supplied to the Assembly Center are key to this plan meeting the program needs. This should be specified in a part-by-part basis, with timing specified by program build event dates. Frequently, the Body Shop Validation Plan will require this information to justify certain part quantities to meet its' intended build-by-objectives. These plans must include the key events, timing schedules, methods and resources needed to fully validate the Stamping / Press system.

Validation methods, tools and procedures to be used for validating each requirement are identified and include the following: workstation/subsystem level, major manufacturing system level, and system level for design, pre-production, vendor/integrator, product quality standards, JES, error-proofing, and total plant validation.

Past launch failures have occurred when there were mismatches between one area's plan and the deliverables from another area or an exclusion of a requirement from another area. An example of this is planning for a BIW unit before one has been built, or not incorporating the appropriate quality standards or not comprehending the material flow plan.

Timing: *Starts: (84) weeks before SORP – Ends: (80) weeks before SORP*

Check List:

1. *Reporting Program Status*
2. *Timing Chart developed*
3. *Die Timing*
   - *3.1. Die Processing*
   - *3.2. Die Design*
   - *3.3. Construction*
   - *3.4. Batch Changes*
   - *3.5. T-1 through T-6*
   - *3.6. T-7 through T-8*
   - *3.7. PPAP*
4. *Identify T-event Coordinator and Support Personnel*
5. *Perform Capacity Analysis*
   - *5.1. Press Assignments*
   - *5.2.* ***CSPC*** *Assigned to Dies*

- *5.3. Stroking Rate Projections*
- *5.4. Lot Sizes Determined*
- *5.5. Bailer House Impacts*
- *5.6. Service Volume Capability Analysis*
- *5.7. Blanking Source Complete*

6. *Complete "Blank" planning*
   - *6.1. Material Specs Complete*
   - *6.2. Supplier Identified*
   - *6.3. Blank Die Tryout*
   - *6.4. Additional Pallets and Pins*
   - *6.5. Blanks available for T-events*
   - *6.6. Material Contracts*
   - *6.7. Shipping Schedules*
   - *6.8. Packing Criteria*
   - *6.9. Material Test Drawing*
   - *6.10. Blank Location Sheets*
   - *6.11. Quantity of Blanks per Pallet*
7. *Complete Material planning*
8. *Perform Container Analysis*
   - *8.1. Alternative Part Storage*
   - *8.2. Concept Agreement Buyoff*
   - *8.3. PO Prototype Release Date*
   - *8.4. Transportation Simulation*
   - *8.5. Testing with Parts*
   - *8.6. Total Racks Required*
   - *8.7. Stack Heights Determined*
   - *8.8. Stamping Buyoff*
   - *8.9. Fabrication Buyoff*
   - *8.10. Material Buyoff*
   - *8.11. Ergonomic Buyoff*
   - *8.12. Quality Buyoff*
   - *8.13. Safety Buyoff*
   - *8.14. IWR Status Date*
   - *8.15. PO Production Release Date*
   - *8.16. Production Quantities Ordered*
   - *8.17. First Online Production Rack Available*
   - *8.18. 500 Piece Storage for T-7 Tryouts with Production Containers*
9. *Layouts, GMS Compliant*
   - *9.1. Metal Finish Area Identified*
   - *9.2. Salvage Area Identified*
   - *9.3. Fixture Storage Identified*
   - *9.4. Finger / Gripper Tooling Carts Identified*
   - *9.5. Die Storage Identified*
   - *9.6. Container Storage Identified*
   - *9.7. Loading Process*
   - *9.8. End of Line Orientation with Initial Ergo Evaluation*
   - *9.9. Presentation Requirements at Conveyor*
   - *9.10. Ergonomic Lifting Guideline Evaluation*
10. *Operation readiness*
    - *10.1. Kanban Cards Made*
    - *10.2. Update Inventory sheets*
    - *10.3. Update Stroking Rate Sheets*
    - *10.4. Update Part List Mass*
    - *10.5. Piece Cost*
    - *10.6. Update PM&C*
    - *10.7. Update Marquees / Andon Board*
11. *Team Member training*
12. *Part Quality*
    - *12.1. Fixtures*

12.2. PPAP
12.3. Surface Quality
12.4. Measuring Programs
12.5. Quality Standards / Checking Procedure
13. Equipment Timing & Available Floor Space / Staging Area
14. MVB Planning
15. Seamless Tryout
16. Service Parts Requirements
17. Product Quality Standards
18. Safety and Ergonomics
19. Throughput Improvement Process
20. Clearance Checks
21. Hand tools (K/tools) and Production Aides
22. Error-Proofing
23. Math Modeling and Simulation
24. Global Manufacturing Systems
25. Vehicle Build Documents
26. Mass Data Analysis
27. Global Design for Health & Safety

Deliverable:
1. *Plan reviewed at GLP Workshop*
2. *Documented & bought-off Validation Plan*

Reference:
1. *Program MR and MSD*
2. *KCDS Reference Manual (QN-1805)*
3. *Advanced Product Quality Planning and Control Manual (QN-2103)*
4. *Statistical Process Control Manual (QN-1981)*
5. *Potential FMEA Reference Manual (QN-2102)*
6. *QS 9000 and QS 9000 Tooling and Equipment Supplement*
7. *Reliability and Maintainability Guidelines for Manufacturing Machinery and Equipment (SAE M-110)*
8. *Industrial Equipment Reliability and Maintainability Validation Procedures (GMUTS MTL 4364)*
9. *GM Standard ERG 1.0*
10. *Measurement Systems Analysis (QN-2104)*
11. *Machine/Process Capability Reference Manual (QN-754)*
12. *Workstation Readiness Process*
13. *Launch Training Plan (element C1)*
14. *GMVO Technical Manual Specification for Equipment and Manufacturing Systems (Document No. TMS-1)*
15. *Electronic Error-proofing UAT Guide*
16. *Appendix R Error-proofing UAT*
17. *Manufacturing Quality Launch Plan (see location of website in Appendix C)*
18. *Problem Documentation Worksheets*
19. *GLP Best Practices Website (see location of website in Appendix C)*

Develop Production Team Member Training Plan
Execution Responsibility: *Plant Launch Manager*

Description: *This includes the strategies to prepare the launch teams in the development and execution of team member training plans. The plans should include both on-line and off-line team member training activities that will help resolve process and quality issues for MVBs prior to SORP. The plan must include Job Instruction Training which will verify that Team Members are trained and qualified to perform their jobs, and ensure that Team Members are trained to work safely, follow standardized work, and meet all quality and productivity requirements.*

Timing: *Starts: (74) weeks before SORP- Ends: (70) weeks before SORP*

Check List:

1. *Team Member Training Planning*
   - *1.1. Assign team member training planning responsibility*
   - *1.2. Determine on-the-job training requirements*
   - *1.3. Develop training plans*
   - *1.4. Develop plant monthly training targets*
   - *1.5. Schedule team members into OTJ training*
2. *Training Elements*
   - *2.1. Set Objectives for the training*
     - *2.1.1. Define by when and how many operations each Team Member must know*
       - *2.1.1.1. Use the 2-by-2 rule. Each Team Member should know 2 operations and each operation should have 2 Team Members who know the job by SSF*
       - *2.1.1.2. At a minimum there should be one fully trained Team Member on every job at SSF*
       - *2.1.1.3. Teams may require all team members to know every job*
       - *2.1.1.4. Target training to correspond with MVB events*
   - *2.2. Assess the constraints impacting the plan*
     - *2.2.1. Job rotation requirements*
     - *2.2.2. Number of shifts that need to be trained*
     - *2.2.3. Availability of a Team Member Support Center*
     - *2.2.4. Large Team Sizes*
     - *2.2.5. Complexity – Model Mix and Content*
     - *2.2.6. Introduction of new technology during launch*
     - *2.2.7. Availability of people-freeing up backfill for team member training*
     - *2.2.8. Rolling Launch – adding a new product to an existing line*
     - *2.2.9. Product Complexity – delta from existing product*
     - *2.2.10. Documentation availability (JES/SOS)*
     - *2.2.11. Material availability*
       - *2.2.11.1. Productive material*
       - *2.2.11.2. Amount of bodies and vehicles required*
     - *2.2.12. Tooling and equipment (racks, platforms) availability*
   - *2.3. Establish the commitment for resources*
   - *2.4. Establish a method for tracking progress*
   - *2.5. Ensure a feedback and correction process is in place*
   - *2.6. Track Lessons Learned*
3. *Strategies to Consider*
   - *3.1. Training should include both off-line and on-line training*
   - *3.2. Launch Teams have been formed and are available to teach Group Leaders and Team Leaders*
   - *3.3. Group Leaders and Team Leaders perform operation to:*
     - *3.3.1. Gain first hand experience from the point of view of the Team Member*
     - *3.3.2. Demonstrate Team Member expectations*
     - *3.3.3. Deliver Team Member training*
     - *3.3.4. Develop, learn, and validate the process and documentation*
     - *3.3.5. Asses safety and ergonomic considerations*
     - *3.3.6. Gain the ability to investigate and problem solve the processes*
     - *3.3.7. Develop ownership and accountability*
   - *3.4. Group Leaders and Team Leaders teach the processes to the Team Members*
4. *Guidelines for adjusting repetitions*

4.1. Based upon launch experience and learning curve theory the average team member will need 600 repetitions for job certification
4.2. Based upon the job complexity and operator experience and skill level the number can be adjusted
4.3. New hires may require additional repetitions
4.4. Team Members transferring into a new area may require additional repetitions
4.5. Minor modifications may require fewer repetitions

5. *Team Member Support Center*
5.1. Utilize Team Member Support Center if facility has access to one
5.2. If a Team Member Support Center is not available determine the feasibility of developing one
5.2.1. Include the following groups in developing and TMSC: Production, Maintenance, Quality, Material, Training, GMS Integration Center, Manufacturing Engineering, WFG, etc.
5.2.2. Establish smaller training areas if an OSC is not practical
5.3. The TMSC should be used to support Group Leaders, Team Leaders, and Team members in developing and training standardized work on each operation
5.4. The TMSC should not be utilized to certify an operator beyond 2 quadrants on the Flexibility Chart. Full certification (quadrants 3 & 4) should be accomplished at the actual production workstation

Reference:

1. *Job Instruction Training Course #18561*
2. *Launch Training Strategies – Team Members (see Appendix C for website)*
3. *Launch Team Bill of Training*

B8. Body Shop Validation Plan

Execution Responsibility: *Body Launch Manager, PLM / Plant Launch Team*

Description: *Develop a Manufacturing System plan for Body, which validates not only the activities within body shop but also integrates with other areas. These plans must include the key events, timing schedules, methods and resources needed to fully validate the functional system.*

These plans should converge to ensure that parts/units will be available to support the Product Process Validation Vehicles (PPV)/Manufacturing Validation Build Material Required Dates. Additionally, these plans need to support both the Matching and Dimensional execution elements. Past launch failures have occurred when there were mismatches between one area's plan and the deliverables from another area or an exclusion of a requirement from another area. An example of this is planning for a BIW unit before one has been built, or not incorporating the appropriate quality standards or not comprehending the material flow plan.

Validation methods, tools and procedures to be used for validating each requirement are identified and include the following: workstation/subsystem level, major manufacturing system level, and system level for design, pre-production, vendor/integrator, product quality standards, Job Element Sheet (JES), error-proofing, and total plant validation.

Timing: *Starts: (84) weeks before SORP – Ends: (80) weeks before SORP*

Check List:

1. *Reporting Program Status*
2. *Timing Chart Developed*

3. *Identify Support Personnel*
4. *Perform Capacity Analysis*
5. *Complete Material Planning*
6. *Perform Container Analysis*
7. *Layouts, GMS Compliant*
8. *Operation Readiness*
9. *Team Member Training*
10. *Part Quality*
11. *Equipment timing & Available Floor Space / Staging Area*
12. *MVB planning*
13. *Service Parts Requirements*
14. *Product Quality Standards*
15. *Safety and Ergonomics*
16. *Throughput Improvement Process*
17. *Clearance Checks*
18. *Hand tools (K/tools) and Production Aides*
19. *Error-Proofing*
20. *Math Modeling and Simulation*
21. *Global Manufacturing Systems*
22. *Vehicle Build Documents*
23. *Mass Data Analysis*
24. *Global Design for Health & Safety*

Deliverable:

1. *All Plans reviewed at GLP Workshop*
2. *Documented & bought-off Validation plans for manufacturing systems.*

Reference:

1. *Program MR and MSD*
2. *KCDS Reference Manual (QN-1805)*
3. *Advanced Product Quality Planning and Control Manual (QN-2103)*
4. *Statistical Process Control Manual (QN-1981)*
5. *Potential FMEA Reference Manual (QN-2102)*
6. *QS 9000 and QS 9000 Tooling and Equipment Supplement*
7. *Reliability and Maintainability Guidelines for Manufacturing Machinery and Equipment (SAE M-110)*
8. *Industrial Equipment Reliability and Maintainability Validation Procedures (GMUTS MTL 4364)*
9. *GM Standard ERG 1.0*
10. *Measurement Systems Analysis (QN-2104)*
11. *Machine/Process Capability Reference Manual (QN-754)*
12. *Workstation Readiness Process*
13. *Launch Training Plan (element C1)*
14. *GMVO Technical Manual Specification for Equipment and Manufacturing Systems (Document No. TMS-1)*
15. *Electronic Error-proofing UAT Guide*
16. *Appendix R Error-proofing UAT*
17. *Manufacturing Quality Launch Plan (see location of website in Appendix C)*
18. *Problem Documentation Worksheets*
19. *GLP Best Practices Website (see location of website in Appendix C)*

Develop Production Team Member Training Plan

Description: ***Process Description same as B7.***

Timing: *Starts: (74) weeks before SORP- Ends: (70) weeks before SORP*

Check List:

1. *Team Member Training Planning*
   1.1. Assign team member training planning responsibility

1.2. Determine on-the-job training requirements
1.3. Develop training plans
1.4. Develop plant monthly training targets
1.5. Schedule team members into OTJ training

2. *Training Elements*
   2.1. Set Objectives for the training
      2.1.1. Define by when and how many operations each Team Member must know
         2.1.1.1. Use the 2-by-2 rule. Each Team Member should know 2 operations and each operation should have 2 Team Members who know the job by SSF
         2.1.1.2. At a minimum there should be one fully trained Team Member on every job at SSF
         2.1.1.3. Teams may require all team members to know every job
         2.1.1.4. Target training to correspond with MVB events
   2.2. Assess the constraints impacting the plan
      2.2.1. Job rotation requirements
      2.2.2. Number of shifts that need to be trained
      2.2.3. Availability of a Team Member Support Center
      2.2.4. Large Team Sizes
      2.2.5. Complexity – Model Mix and Content
      2.2.6. Introduction of new technology during launch
      2.2.7. Availability of people-freeing up backfill for team member training
      2.2.8. Rolling Launch – adding a new product to an existing line
      2.2.9. Product Complexity – delta from existing product
      2.2.10. Documentation availability (JES/SOS)
      2.2.11. Material availability
         2.2.11.1. Productive material
         2.2.11.2. Amount of bodies and vehicles required
      2.2.12. Tooling and equipment (racks, platforms) availability
   2.3. Establish the commitment for resources
   2.4. Establish a method for tracking progress
   2.5. Ensure a feedback and correction process is in place
   2.6. Track Lessons Learned
3. *Strategies to Consider*
   3.1. Training should include both off-line and on-line training
   3.2. Launch Teams have been formed and are available to teach Group Leaders and Team Leaders
   3.3. Group Leaders and Team Leaders perform operation to:
      3.3.1. Gain first hand experience from the point of view of the Team Member
      3.3.2. Demonstrate Team Member expectations
      3.3.3. Deliver Team Member training
      3.3.4. Develop, learn, and validate the process and documentation
      3.3.5. Asses safety and ergonomic considerations
      3.3.6. Gain the ability to investigate and problem solve the processes
      3.3.7. Develop ownership and accountability
   3.4. Group Leaders and Team Leaders teach the processes to the Team Members
4. *Guidelines for adjusting repetitions*
   4.1. Based upon launch experience and learning curve theory the average team member will need 600 repetitions for job certification
   4.2. Based upon the job complexity and operator experience and skill level the number can be adjusted
   4.3. New hires may require additional repetitions

4.4. Team Members transferring into a new area may require additional repetitions
4.5. Minor modifications may require fewer repetitions
5. *Team Member Support Center*
5.1. Utilize Team Member Support Center if facility has access to one
5.2. If a Team Member Support Center is not available determine the feasibility of developing one
5.2.1. Include the following groups in developing and TMSC: Production, Maintenance, Quality, Material, Training, GMS Integration Center, Manufacturing Engineering, WFG, etc.
5.2.2. Establish smaller training areas if an OSC is not practical
5.3. The TMSC should be used to support Group Leaders, Team Leaders, and Team members in developing and training standardized work on each operation
5.4. The TMSC should not be utilized to certify an operator beyond 2 quadrants on the Flexibility Chart. Full certification (quadrants 3 & 4) should be accomplished at the actual production workstation

Reference:

1. *Job Instruction Training Course #18561*
2. *Launch Training Strategies – Team Members (see Appendix C for website)*
3. *Launch Team Bill of Training*

B9. Paint Shop Validation Plan

Execution Responsibility: *Paint Launch Manager, Paint MSIE, PLM / Plant Launch Team*

Description: *The Global Paint and Polymers Center (GPPC) responsible for both product and manufacturing engineering support. Paint shop tooling, such as carriers, details, production aides, etc is the responsibility of the GPPC.*

Develop a Manufacturing System plan for Paint shop, which validates not only the activities within their areas but also integrates with other areas. These plans must include the key events, timing schedules, methods and resources needed to fully validate the functional system.

These plans should converge to ensure that parts/units will be available to support the PPV/Manufacturing Validation Build Material Required Dates. Additionally, these plans need to support both the Matching and Dimensional execution elements.

Validation methods, tools and procedures to be used for validating each requirement are identified and include the following: workstation/subsystem level, major manufacturing system level, and system level for design, pre-production, vendor/integrator, product quality standards, JES, error-proofing, and total plant validation.

Past launch failures have occurred when there were mismatches between one area's plan and the deliverables from another area or an exclusion of a requirement from another area.

Timing: *Starts: (84) weeks before SORP – Ends: (80) weeks before SORP*

Check List:

1. *Reporting Program Status*
2. *Timing Chart Developed*
3. *Identify Support Personnel*
4. *Perform Capacity Analysis*
5. *Complete Material Planning*
6. *Perform Container Analysis*
7. *Layouts, GMS Compliant*

8. *Operation Readiness*
9. *Team Member Training*
10. *Part Quality*
11. *Equipment timing & Available Floor Space / Staging Area*
12. *MVB planning*
13. *Service Parts Requirements*
14. *Product Quality Standards*
15. *Safety and Ergonomics*
16. *Throughput Improvement Process*
17. *Clearance Checks*
18. *Hand tools (K/tools) and Production Aides*
19. *Error-Proofing*
20. *Math Modeling and Simulation*
21. *Global Manufacturing Systems*
22. *Vehicle Build Documents*
23. *Mass Data Analysis*
24. *Global Design for Health & Safety*

Deliverable:

1. *All Plans reviewed at GLP Workshop*
2. *Documented & bought-off Validation plans for manufacturing systems.*

Reference:

1. *Program MR and MSD*
2. *KCDS Reference Manual (QN-1805)*
3. *Advanced Product Quality Planning and Control Manual (QN-2103)*
4. *Statistical Process Control Manual (QN-1981)*
5. *Potential FMEA Reference Manual (QN-2102)*
6. *QS 9000 and QS 9000 Tooling and Equipment Supplement*
7. *Reliability and Maintainability Guidelines for Manufacturing Machinery and Equipment (SAE M-110)*
8. *Industrial Equipment Reliability and Maintainability Validation Procedures (GMUTS MTL 4364)*
9. *GM Standard ERG 1.0*
10. *Measurement Systems Analysis (QN-2104)*
11. *Machine/Process Capability Reference Manual (QN-754)*
12. *Workstation Readiness Process*
13. *Launch Training Plan (element C1)*
14. *GMVO Technical Manual Specification for Equipment and Manufacturing Systems (Document No. TMS-1)*
15. *Electronic Error-proofing UAT Guide*
16. *Appendix R Error-proofing UAT*
17. *Manufacturing Quality Launch Plan (see location of website in Appendix C)*
18. *Problem Documentation Worksheets*
19. *GLP Best Practices Website (see location of website in Appendix C)*

Develop Production Team Member Training Plan

Description: ***Process Description same as B7.***

Timing: *Starts: (74) weeks before SORP- Ends: (70) weeks before SORP*

Check List:

1. *Team Member Training Planning*
   - *1.1. Assign team member training planning responsibility*
   - *1.2. Determine on-the-job training requirements*
   - *1.3. Develop training plans*
   - *1.4. Develop plant monthly training targets*
   - *1.5. Schedule team members into OTJ training*
2. *Training Elements*

2.1. Set Objectives for the training
2.1.1. Define by when and how many operations each Team Member must know
2.1.1.1. Use the 2-by-2 rule. Each Team Member should know 2 operations and each operation should have 2 Team Members who know the job by SSF
2.1.1.2. At a minimum there should be one fully trained Team Member on every job at SSF
2.1.1.3. Teams may require all team members to know every job
2.1.1.4. Target training to correspond with MVB events
2.2. Assess the constraints impacting the plan
2.2.1. Job rotation requirements
2.2.2. Number of shifts that need to be trained
2.2.3. Availability of a Team Member Support Center
2.2.4. Large Team Sizes
2.2.5. Complexity – Model Mix and Content
2.2.6. Introduction of new technology during launch
2.2.7. Availability of people-freeing up backfill for team member training
2.2.8. Rolling Launch – adding a new product to an existing line
2.2.9. Product Complexity – delta from existing product
2.2.10. Documentation availability (JES/SOS)
2.2.11. Material availability
2.2.11.1. Productive material
2.2.11.2. Amount of bodies and vehicles required
2.2.12. Tooling and equipment (racks, platforms) availability
2.3. Establish the commitment for resources
2.4. Establish a method for tracking progress
2.5. Ensure a feedback and correction process is in place
2.6. Track Lessons Learned
3. *Strategies to Consider*
3.1. Training should include both off-line and on-line training
3.2. Launch Teams have been formed and are available to teach Group Leaders and Team Leaders
3.3. Group Leaders and Team Leaders perform operation to:
3.3.1. Gain first hand experience from the point of view of the Team Member
3.3.2. Demonstrate Team Member expectations
3.3.3. Deliver Team Member training
3.3.4. Develop, learn, and validate the process and documentation
3.3.5. Asses safety and ergonomic considerations
3.3.6. Gain the ability to investigate and problem solve the processes
3.3.7. Develop ownership and accountability
3.4. Group Leaders and Team Leaders teach the processes to the Team Members
4. *Guidelines for adjusting repetitions*
4.1. Based upon launch experience and learning curve theory the average team member will need 600 repetitions for job certification
4.2. Based upon the job complexity and operator experience and skill level the number can be adjusted
4.3. New hires may require additional repetitions
4.4. Team Members transferring into a new area may require additional repetitions
4.5. Minor modifications may require fewer repetitions
5. *Team Member Support Center*
5.1. Utilize Team Member Support Center if facility has access to one

5.2. If a Team Member Support Center is not available determine the feasibility of developing one

5.2.1. Include the following groups in developing and TMSC: Production, Maintenance, Quality, Material, Training, GMS Integration Center, Manufacturing Engineering, WFG, etc.

5.2.2. Establish smaller training areas if an OSC is not practical

5.3. The TMSC should be used to support Group Leaders, Team Leaders, and Team members in developing and training standardized work on each operation

5.4. The TMSC should not be utilized to certify an operator beyond 2 quadrants on the Flexibility Chart. Full certification (quadrants 3 & 4) should be accomplished at the actual production workstation

Reference:

1. *Job Instruction Training Course #18561*
2. *Launch Training Strategies – Team Members (see Appendix C for website)*
3. *Launch Team Bill of Training*

B10. General Assembly Shop Validation Plan

Execution Responsibility: *GA Launch Manager, PLM / Plant Launch Team*

Description: *Develop a Manufacturing System plan for General Assembly, which validates not only the activities within their areas but also integrates with other areas. These plans must include the key events, timing schedules, methods and resources needed to fully validate the functional system.*

These plans should converge to ensure that parts/units will be available to support the PPV/Manufacturing Validation Build Material Required Dates. Additionally, these plans need to support both the Matching and Dimensional execution elements.

Validation methods, tools and procedures to be used for validating each requirement are identified and include the following: workstation/subsystem level, major manufacturing system level, and system level for design, pre-production, vendor/integrator, product quality standards, JES, error-proofing, and total plant validation.

Past launch failures have occurred when there were mismatches between one area's plan and the deliverables from another area or an exclusion of a requirement from another area. An example of this is planning for a BIW unit before one has been built, or not incorporating the appropriate quality standards or not comprehending the material flow plan.

Timing: *Starts: (84) weeks before SORP – Ends: (80) weeks before SORP*

Check List:

1. *Reporting Program Status*
2. *Timing Chart Developed*
3. *Identify Support Personnel*
4. *Perform Capacity Analysis*
5. *Complete Material Planning*
6. *Perform Container Analysis*
7. *Layouts, GMS Compliant*
8. *Operation Readiness*
9. *Team Member Training*
10. *Part Quality*
11. *Equipment timing & Available Floor Space / Staging Area*
12. *MVB planning*

13. *Service Parts Requirements*
14. *Product Quality Standards*
15. *Safety and Ergonomics*
16. *Throughput Improvement Process*
17. *Clearance Checks*
18. *Hand tools (K/tools) and Production Aides*
19. *Error-Proofing*
20. *Math Modeling and Simulation*
21. *Global Manufacturing Systems*
22. *Vehicle Build Documents*
23. *Mass Data Analysis*
24. *Global Design for Health & Safety*

Deliverable:

1. *All Plans reviewed at GLP Workshop*
2. *Documented & bought-off Validation plans for manufacturing systems.*

Reference:

1. *Program MR and MSD*
2. *KCDS Reference Manual (QN-1805)*
3. *Advanced Product Quality Planning and Control Manual (QN-2103)*
4. *Statistical Process Control Manual (QN-1981)*
5. *Potential FMEA Reference Manual (QN-2102)*
6. *QS 9000 and QS 9000 Tooling and Equipment Supplement*
7. *Reliability and Maintainability Guidelines for Manufacturing Machinery and Equipment (SAE M-110)*
8. *Industrial Equipment Reliability and Maintainability Validation Procedures (GMUTS MTL 4364)*
9. *GM Standard ERG 1.0*
10. *Measurement Systems Analysis (QN-2104)*
11. *Machine/Process Capability Reference Manual (QN-754)*
12. *Workstation Readiness Process*
13. *Launch Training Plan (element C1)*
14. *GMVO Technical Manual Specification for Equipment and Manufacturing Systems (Document No. TMS-1)*
15. *Electronic Error-proofing UAT Guide*
16. *Appendix R Error-proofing UAT*
17. *Manufacturing Quality Launch Plan (see location of website in Appendix C)*
18. *Problem Documentation Worksheets*
19. *GLP Best Practices Website (see location of website in Appendix C)*

Develop Production Team Member Training Plan

Description: ***Process Description same as B7.***

Timing: *Starts: (74) weeks before SORP- Ends: (70) weeks before SORP*

Check List:

1. *Team Member Training Planning*
   - *1.1. Assign team member training planning responsibility*
   - *1.2. Determine on-the-job training requirements*
   - *1.3. Develop training plans*
   - *1.4. Develop plant monthly training targets*
   - *1.5. Schedule team members into OTJ training*
2. *Training Elements*
   - *2.1. Set Objectives for the training*
     - *2.1.1. Define by when and how many operations each Team Member must know*

2.1.1.1. Use the 2-by-2 rule. Each Team Member should know 2 operations and each operation should have 2 Team Members who know the job by SSF
2.1.1.2. At a minimum there should be one fully trained Team Member on every job at SSF
2.1.1.3. Teams may require all team members to know every job
2.1.1.4. Target training to correspond with MVB events
2.2. Assess the constraints impacting the plan
2.2.1. Job rotation requirements
2.2.2. Number of shifts that need to be trained
2.2.3. Availability of a Team Member Support Center
2.2.4. Large Team Sizes
2.2.5. Complexity – Model Mix and Content
2.2.6. Introduction of new technology during launch
2.2.7. Availability of people-freeing up backfill for team member training
2.2.8. Rolling Launch – adding a new product to an existing line
2.2.9. Product Complexity – delta from existing product
2.2.10. Documentation availability (JES/SOS)
2.2.11. Material availability
2.2.11.1. Productive material
2.2.11.2. Amount of bodies and vehicles required
2.2.12. Tooling and equipment (racks, platforms) availability
2.3. Establish the commitment for resources
2.4. Establish a method for tracking progress
2.5. Ensure a feedback and correction process is in place
2.6. Track Lessons Learned
3. *Strategies to Consider*
3.1. Training should include both off-line and on-line training
3.2. Launch Teams have been formed and are available to teach Group Leaders and Team Leaders
3.3. Group Leaders and Team Leaders perform operation to:
3.3.1. Gain first hand experience from the point of view of the Team Member
3.3.2. Demonstrate Team Member expectations
3.3.3. Deliver Team Member training
3.3.4. Develop, learn, and validate the process and documentation
3.3.5. Asses safety and ergonomic considerations
3.3.6. Gain the ability to investigate and problem solve the processes
3.3.7. Develop ownership and accountability
3.4. Group Leaders and Team Leaders teach the processes to the Team Members
4. *Guidelines for adjusting repetitions*
4.1. Based upon launch experience and learning curve theory the average team member will need 600 repetitions for job certification
4.2. Based upon the job complexity and operator experience and skill level the number can be adjusted
4.3. New hires may require additional repetitions
4.4. Team Members transferring into a new area may require additional repetitions
4.5. Minor modifications may require fewer repetitions
5. *Team Member Support Center*
5.1. Utilize Team Member Support Center if facility has access to one
5.2. If a Team Member Support Center is not available determine the feasibility of developing one

5.2.1. Include the following groups in developing and TMSC: Production, Maintenance, Quality, Material, Training, GMS Integration Center, Manufacturing Engineering, WFG, etc.

5.2.2. Establish smaller training areas if an OSC is not practical

5.3. The TMSC should be used to support Group Leaders, Team Leaders, and Team members in developing and training standardized work on each operation

5.4. The TMSC should not be utilized to certify an operator beyond 2 quadrants on the Flexibility Chart. Full certification (quadrants 3 & 4) should be accomplished at the actual production workstation

Reference:

1. *Job Instruction Training Course #18561*
2. *Launch Training Strategies – Team Members (see Appendix C for website)*
3. *Launch Team Bill of Training*

B11. Develop End of Line Test Readiness Plan

Execution Responsibility: *Assembly Verification Group/Quality Operations*

Description: *The End of Line Test (EOLT) events refers to the planned activities which test and verify functionality of vehicle software, modules and plant test equipment. The EOLT activities occur at various times relative to physical builds. The EOLT plan utilizes vehicles or bucks equipped with the latest available software and modules. These vehicles may be electrical architecture bucks but must be supported by product engineering with latest available components for testing.*

There are three main components to each EOLT event:

The Review Event is a meeting where Powertrain (PT)/Product Engineering (PE) provide product status prior to the Evaluation event. This includes any open issues. Risk assessment is performed and an action plan is established and required. The PE/PT Engineer owns the plan.

The Evaluation Event is a physical review of a vehicle demonstrating the solutions to the IV build issues for software systems integration. It is the actual event where an integration vehicle is tested with the latest vehicle software on AVG/EOLT equipment.

The Functional Buy-off Event is a physical review event demonstrating the solutions to all found build issues for electrical software systems integration. Additionally, it is to assess the proper function of the vehicle after being exposed to EOLT equipment. It is the actual event where a vehicle is tested with the latest vehicle software on AVG/EOLT equipment. Functional buyoffs could last as much as a week.

There may be some different regional event processes applied however the EOLT events are part of the GVDP & GLP global template. The graphic shows the generic timing and general requirements.

Check List:

1. *All Calibration and XML Files GPDS and CASH released latest at week -34 (2 weeks before GA PPV MRD)*
2. *Vehicle Build Data information Source must be available in regular production system (e-Flex) for PPV*
3. *Electronic Control Unit Readiness according to GVDP Milestones*
4. *Require at least 10 vehicles available off-line, equipped with the latest electrical Hardware and Software at least 6 weeks before first vehicle is built online in plant. Hardware and Software for these*

vehicles shall be at a minimum status equivalent to PPV status (Carry-over modules for derivatives shall contain the latest component levels from the lead program vehicle).

5. *Caster Camber*
   5.1 Toe-In
   5.2 Hardware/Software Integration

Timing: *Starts (-36) weeks to SORP*

Reference:

1. *Assembly Verification Group website (see address in Appendix C)*
2. *EOLT Overview presentation is available on GVDP Quicklinks (see address in Appendix C)*

B12. Develop Build By Objective Plan for Product, Process and People

Execution Responsibility: *Plant* Launch Manager/Plant Launch Team

Description: Build by Objective is comprised of two distinct activities. The first phase begins during the Product Process Validation Vehicles *(PPV)* plan development, when training and process validation needs are consolidated with the needs from Engineering, Marketing, Quality and other customers. During this phase, the objectives will help to define the resource needs of the organization. The detail plans will establish who, what, when, where, how and why of each activity. Attention should be paid to the need for MVB units targeted to be retained at the Assembly plant to aid in additional training, development of tooling aids, and the resolutions of build issues.

The second activity is to communicate the expectations of each build and have a mechanism to measure the success in meeting those expectations. This communication serves to keep the organization abreast of the plan and establishes what should and should not be seen during the builds, eliminating false expectations. The measurement system should produce objective evidence that sufficient progress is being made to achieve the goals of the program.

The fundamental questions to ask are:

- What is the specific reason for building the vehicles?
- What are the specific results that should be achieved at the end of each bucket build?

If those two questions have not been answered, then the team is building to build and not building towards a great launch. The answers to the questions are NOT that the vehicles are being built because there is a customer for them, rather, the answers are to have specific goals in mind in regards to operators being fully trained, equipment being validated, material flow being validated, etc., as part of a natural progression of incrementally achieving the readiness of the workforce and plant processes to achieve a flawless launch.

Timing: Starts: (76) weeks before SORP – Ends: (70) week before SORP for all programs (GA and body)

Check List:

1. Launch Rules

PPV
Start of Non-Saleable
End of Non-Saleable
Start of Saleable
End of Saleable

2. Quantity, Model, Options and special features for MVB units
3. Special Communication required during the build
4. Audits Required

GCA
Squeak & Rattle
Water Test
Total Torque Check
Surface Quality
Additional as required

5. Quality targets developed

Direct Run Rate (DRR)
Direct Run Loss (DRL)
GCA

6. Training Plan targets
7. Special Test required for MVB units

Overnight Rides
Paint Film Build Test
Powertrain Audit
Electrical Diagnostic Worksheet
Additional as required

8. Anticipated Retrofits
9. Holds required to be placed on MVB units
10. Shipping requirements
11. Destination of MVB units
12. Expectations for the build event

Vehicle scheduling
Process Lessons Learned from previous builds
Extent that the Production Tooling is to be used.
Parts routing status
Sequence commodities expectations
Completeness of JES/SOS
Changes to the Build Manifest
Gapping Strategy
Administration of TWO's
Process for capturing build issues
Dimensional Glide Path status
Quality feedback
Containerization Plan
PPAP status
Operator Training progress
Anticipated IR/EWO’s to be validated during the build
Review Operational Readiness Status
Additional as required

Reference:

1. Mfg. Validation Builds details (numbers, events and schedule)
2. *GMS Readiness Checklist*

B13. Develop Dimensional Validation Plan

Execution Responsibility: *Body Shop Coordinator / Quality (Receiver Plant)*

Description: The *Launch Dimensional Coordinator (LDC)* is responsible for the development and execution of the Launch Dimensional Management Plan,

which defines events, activities and resources required to assess the ability of the product and process to meet dimensional requirements. This Plan, which includes measurement systems, sampling plans, acceptance criteria, and key enablers is integrated into the program vehicle build plans to ensure all launch resources are focused on completion of the deliverables within the plan. The Dimensional Validation Plan is managed at the assembly plant by the *Launch Dimensional Coordinator* and is continually refined until the start of the MVBNS event.

Timing: Starts: (76) weeks before SORP – Ends: (70) weeks before SORP

Check List:

1. Dimensional Control Inspection Plan for program
2. Measurement Strategy Plan for each plant
3. Body-In-White (BIW) Dimensional Glide Path including targets
4. Dimensional Validation Program Enablers for BIW Tune-In
5. Dimensional Validation Program Enablers for GA Tune-In
6. GA/Finished Vehicle Glide path including targets
7. Resource list
8. Exit criteria
9. Dimensional Validation Process Overview Rollout to Launch Team scheduled
10. Data resources identified
11. Dimensional Glidepath

Reference:

1. ABC Metric process

B14. Develop CKD Matching Process

Execution Responsibility: CKD Receiver Plant and CKD Source Plant Quality Teams

Description: The CKD Receiver Plant will conduct a series Matching Events to review and evaluate Localized content (can be either BIW or GA) against a Master Body and Localized Body. The Master Body will be built and shipped from the Source Plant and the Localized Body will be built at the Receiver Plant. The purpose it to drive the Localized body to be dimensionally equivalent to the Master Body from the source plant. The intent is to drive deviations and adjustments to Localized content only, and not to the Source Plant content.

The overall objective of Iterative Matching is to drive the body dimensional quality to nominal specifications. The key elements of Iterative Matching include – building welded assemblies in production tools, iterative part submissions with quality improvements, and a small empowered leadership team.

Matching 3 (M3) & Matching 4 (M4) are assembly plant on-line builds. The M3 build is a vehicle from the first bucket of the manufacturing validation build non-saleable event. Its purpose is to validate that the decisions/fixes from the earlier Matching events were implemented and effective, and to ensure that vehicle fit items are robust to the manufacturing process. The M4 build is a vehicle from the first bucket of the manufacturing validation build saleable event. Its purpose is to validate fine-tuned M3 decisions/fixes were implemented and effective, and to make decisions on final fit enhancements.

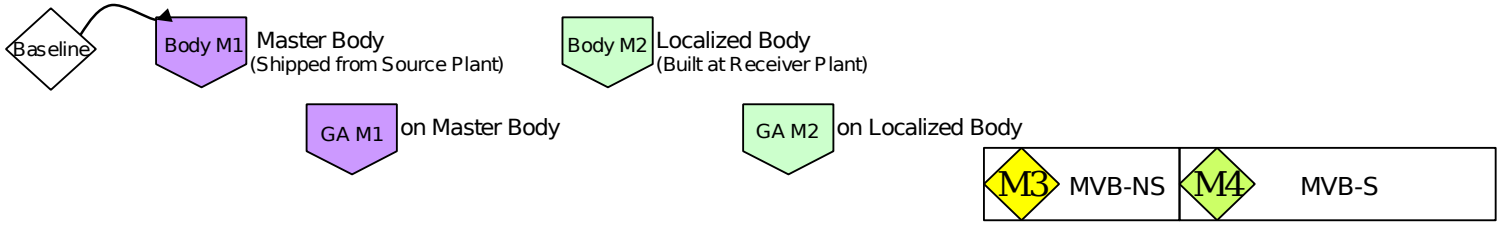
NOTE: The Master Body must be remeasured upon receipt from SUP Plant to ensure no change during shipment.

Timing: Start: 35 weeks before SORP @ Receiver Plant
Ends: MVB Non-Saleable at Receiver Plant

Check List:

1. Master Body from Source Plant
2. GA Parts from Source Plant
3. Data supporting Master Body and GA Parts
4. Body Shop Assembly Tooling at Receiver Plant
5. Measurement Tools to collect data on Receiver Plant builds

GM Global CKD Matching Plan for Receiver Plant (Guidelines)



Baseline

Purpose of Baseline is to obtain Master Body (with closures) and GA parts from CKD source plant. The Master Body and GA parts should be supported with 3-5 sets of dimensional data. This will be used for problem solving, root causing, and decision making. Receiver plant may also request an additional body without closures.

Body M1
GA M1

The Matching 1 event will utilize the Master Body (same property as Baseline) and install all GA parts (Source plant & Localized content). The purpose is to evaluate the localized GA parts relative to the Master Body. This can be an off-line or on-line build. The output is information for localized (GA and/or Body) part changes/improvements and initial graining decisions (if applicable).

Body M2
GA M2

The Matching 2 event is a body built on-line at the CKD Receiver Plant. This will include the BIW subassemblies from CKD Source plant and the localized body content. All GA parts to be installed on the body. The purpose is to drive the localized built body to match the Master body from the Source plant and to evaluate the fit of localized GA parts, driving them to fit the body. The output is a comparison to Matching 1 results, information for localized (GA & Body) part changes/improvements, and final graining decisions (if applicable).

M3

The Matching 3 body is an on-line build from the first bucket of MVB Non-Saleable. The output is a comparison to Matching 2 results and an evaluation of the finished vehicle relative to requirements (ABC metric & Finished Vehicle Gap/flush).

M4

The Matching 4 body is an on-line build from the first bucket of MVB Saleable. The output is an evaluation of the finished vehicle relative to requirements (ABC metric & Finished Vehicle Gap/flush) with a management review meeting.

	Baseline (Reference)	Matching 1	Matching 2	Matching 3	Matching 4
				MVB-NS1	MVB-S1
Master Body from CKD Source Plant	○	○			
Master GA parts from CKD Source Plant	○	○	○	○	○
Localized Body (built in CKD Receiver plant)			○	○	○
Localized G/A Parts		○	○	○	○

The timing and build content represented here is generic. Each program will evaluate the Source Plant and Localized content to determine the individualized needs of the program.

B15. Communicate Launch Change Management Process

Execution Responsibility: *Manufacturing Integration Manager / Plant* Launch Manager / Program Engineering Manager */ Plant Launch Team*

Description:

Product Red Zone

The Product Red Zone is the point in time when product design change requests are restricted to only those approved by the Launch Change Approval Board (CAB). The Launch CAB manages changes from the 1st Matching Event until Launch Team Release. The objective is to manage change rather than to stop it completely. This change control period is mandatory to ensure the vehicle assembly plants have sufficient time, prior to SORP, to train the work force, to validate their manufacturing systems, and to validate any open issues.

Any Engineering Work Order (EWO) that is written which affects the fit, form or function of a part, MUST invoke a part number change to said part. *Engineering Work Orders (EWOs) that are written to resolve any issue will follow the 19 Point Launch CAB Production Work Order (PRT) Procedure through to closure. If the engineering change affects fit, form, or function of the parts, part number changes are required. Before an EWO can be brought to Launch CAB for approval, an Engineering Try-Out (ETO) needs to be performed. An ETO evaluates / demonstrates that the proposed design change is the correct fix for the issue. When the EWO is ready for implementation within the assembly center, a Production Trial Run (PTR) must be performed to verify acceptable part integration into the assembly plant build process prior to scheduling the part(s). During MVB builds, the bucket builds can be used as the PTR process verification. After SORP the corporate PTR process must be used.*

All Temporary Work Orders (TWO) written for the Launch vehicle are to follow the Notice of Action GPLB-313 Global Temporary Work Order (TWO) Process.

Launch CAB Objectives:

- *Reduce engineering changes by approving only critical changes after P Release*
- *Provide direction to set the Target Implementation Date (TID)*
- *Level change implementation at the Assembly Centers*
- *Discuss and approve all Temporary Work Orders (TWOs) written for the Launch vehicle*

Launch CAB Mandatory Members Include:

- *Program Engineering Manager – PEM*
- *Manufacturing Integration Manager – MIM (if there is a MIM on the program)*
- *Plant Launch Manager - PLM*
- *Change Management Leader – CML*
- *Change Management Coordinator – CMC*
- *Material Launch Manager – MLM*
- *DE Presenting a PRT*
- *Supplier Readiness Manager*

Additional Key Launch CAB Members Include:

- *Plant Launch Manager – PLM*
- *Purchasing Launch Coordinator – PLC*
- *Manufacturing Chief Engineer -- MCE*
- *Supplier Quality Manager --SQE Mgr*
- *Program Purchasing Manager -- PPM or Assistant PPM*
- *Vehicle Line Director – VLD*

- *Body Shop Launch Manager*
- *General Assembly Launch Manager*
- *Quality Launch Manager - QLM*
- *Program Finance*
- *Plant Planning Administrator*
- *IS&S Launch Manager*

The Change Management Coordinator (CMC) works with the Launch Team and in conjunction with the Change Management Leader (CML) by tracking Part Type Work Orders (PRTs) and Temporary Work Orders (TWOs) for engineering changes during the Product Red Zone. The CMC reports directly to the EWO Implementation Manager from the Program Management Process Integration Group and indirectly to the PLM. The CMC will also function as the EWO Implementation Team (EIT) Manager throughout the launch window.

The CML is staffed and funded through the Specifications Organization. The CML is to work with the Designing Engineer (DE), Specification Analyst, MPD Processor and CMC for engineering changes that are to be approved in the Launch CAB.

EIT Objectives:

- *Develop plan for every approved PRT*
- *Obtain stakeholder buy-in to the plan*
- *Monitor execution of PRT for adherence to Launch CAB on-time completion*
- *Resolve roadblocks for PRT implementation*

Process Red Zone

The Process Red Zone is the point in time when all Vehicle Assembly Plant manufacturing process changes are controlled by the Plant Launch Team. This typically starts 6 weeks before SORP and ends at End of Acceleration. This provides a period of stability to allow the plant sufficient time to validate their manufacturing processes. During this period, the plant can ensure that operation certification is complete, that the workforce is trained, and that ergonomic / safety evaluations are complete.

Any Process Change request that impacts workstations, tooling, platforms, installation moves, etc. from Product/Process Validation Vehicles (PPV) to End of Acceleration (EOA) needs to follow a defined change management process. The process should leverage any existing on-site change management process, as long as it includes some key attributes; scope of change, completion date, break point, priority, estimated cost, implementation plan, and the Global Launch Team approvals for the region. The process should include a forum for managing and tracking all process change requests that are developed from anyone involved with the launch process (i.e. daily or weekly reviews) and who is the Process Leader. Each request should be championed thru the ME lead for the impacted area to ensure appropriate submission thru the review process.

The goal of the Process Change Management Process is to focus and organize all the process change requests to allow for proper scheduling and integration into the overall launch development.

Change Management Plan

The proposed change management process and timing should be reviewed at the Global Launch Process Workshop to obtain the agreement from the program launch team members. This will verify the proposed review and approval process, including the approval team member's names prior to plant integration, installation, and build events.

Timing: Starts: (41) weeks before SORP – Ends: @ EOA (End of Acceleration)

Check List:

1. *Product Engineering and Assembly Process Change Management Procedure established*
   1.1. Transition timing from Regular CAB to Launch CAB established
   1.2. Change review team identified
   1.3. Change approval procedure communicated
   1.4. Change criteria documented
   1.5. 19 Point Launch CAB Procedure understood
2. *Vehicle design validation plan timing / manufacturing validation build schedule consistent*
3. *Multiple change inputs controlled*
   3.1. Launch Build Issues
   3.2. Cost Reduction
   3.3. JD Power

Reference:

1. 19 Point Launch CAB Production Work Order Procedure
2. Launch CAB training information on GLP - Execution website (address located in Appendix C)
3. CAB / EIT information on Quality as a Value website (address located in Appendix C)
4. PTR / ETO information on GMNA Quality website (address located in Appendix C)
5. NOA #PLB 017 Red Zone Guideline
6. NOA #GPLB-313 Global Temporary Work Order (TWO) Process

B16. Monitor Product Design Release Status

Execution Responsibility: Vehicle Chief Engineer

Description: It is absolutely critical that each production design part release event be met on time and with correct information in order to enable the other activities that follow (part validation, manufacturing process design and development, facility rearrangement, training, etc.) so they can also be completed prior to SORP. Parts which are to localized in the sourcing plan may follow shortly after the VDR event. Equally important are parts which will be "redesigned for regional requirements"

Timing: Starts (*90*) weeks before SORP) - Ends (*71*) weeks before SORP

B17. Confirm Part Sourcing & Localization Plan

Execution Responsibility: Program Purchasing Manager

Description: Each Program needs to develop an overall localization plan prior to the Product Program Committee (PPC) event. This will include establishing which key components will be localized, keeping in mind country code requirements. The plans to localize must also include the timing for each commodity's localization and are integrated with the "Source Plant". The overall strategy plan needs to include the commodities and timing for all localized parts.

Product Sourcing must be complete for PPV phase, this means all part sourcing has been executed and any issues that have not been resolved have an owner assigned. These issues should be monitored as potential risks to the program. Achieving the status requirements of the Production Part Approval Process and getting the intended parts on a purchasing contract are fundamental to success and timing of launches. These measurements should be closely monitored throughout the launch cycle.

Timing: Starts: (*82*) weeks before SORP - Ends: (*78*) weeks before SORP

Check List:

1. *Plans in place for all parts sourced and contracted to support program events. Consider the long pipeline of material for overseas parts and how this effects engineering changes during launch. Parts with a high frequency of change, such as wire harnesses, should be sourced domestically.*
2. *Measurement Strategy Plan for each plant*
3. Appendices K and L from Sourcing Contract issues are comprehended
4. *High risk suppliers are identified*
5. *Supplier and Government Contacts Established*
6. *APQP process (PPAP, Run @ Rate, Color Harmony, etc.)*
7. *Container size and standard pack identified*
8. *Sequence / Repack container size and standard pack noted*
9. *Transportation Mode Identified*
10. *Change Management Process*
11. *Both production and pre-production steel sources are the same and are identified early in the program.*

Reference:

1. APQP, Supply Chain Part Planning Users Manual

B18. Develop Supplier Communications Plan

Execution Responsibility: Program Purchasing Manager **/** SQA Launch Manager

Description: A supplier communication plan must be developed to engage suppliers in the launch process. A process has been created which consists of three separately scheduled conferences that establish requirements and expectations for suppliers. Global Purchasing and *Supply Chain Planning (GPSC)* is the organization that supports this activity.

Supplier Communication Conferences need to be structured into the activities planned for this period of time. It is critical to involve all suppliers in the launch process to assure seamless interfacing with all sources. The suggested schedule (for 20-month program) is found in Appendix E.

Timing: (60) weeks before SORP

***Check List**:* *1. Assure timing of events are integrated and appropriate*

B19. Perform Advanced Product Quality Planning Assessment

Execution Responsibility: Program Purchasing Manager/APQP Manager

Description: Assessments are conducted to evaluate the suppliers manufacturing location for all new components to a program. These assessments determine the level of GM Supplier Quality involvement and support throughout the program development process. The assessments include a review of the suppliers manufacturing capabilities related to the physical manufacturing facility and location, quality history, design/technology, program management, and specific business conditions.

The first assessment is conducted after the Technical Review and prior to sourcing and is used as input to the sourcing decision. The second assessment is cumulative from the first and is conducted *prior to first in-plant vehicle builds*. This is an evaluation of the effectiveness of the suppliers' Advanced Product Quality Plan and the implementation of that plan. This is also used as input for the Run @ Rate activity.

Timing: Starts: (78) weeks before SORP – *Ends: @ SORP*

Check List:

1. Utilize Global Purchasing Risk Assessment Format

B20. Monitor Master Process *Documents (MPD) Status*

Execution Responsibility: *Industrial Engineering*

Description The Source Plant releases Assembly Process documentation to the Receiver Plants

The Master Process Documents (MPD's) are assembly build documents which integrate process and product information, conveying an assembly installation for every released part for all product lines. The purpose of the Master Process Document is to support the pre-production physical build events as well as assembly plant production operations. The content of the Production Release MPDs is: part specifications and associated information (UPC, FNA, Torque values and noun name), work elements representing the operation instructions which describe the installation for assembly, Time Analysis for the operation described representing the BEC plus some variable time, tooling information, and an illustration/image depicting the design engineering intent of the assembly operation. The Work in Process (WIP) MPD will only contain a Process and Image. Part specification information (UPC, FNA, Torque values and noun name) can be acquired by using GPDS data which contains a corresponding PAD number to the MPDs.

Released MPD's for new and carry-over program content are available 22 weeks after 100% IVER. MPD's are used by Industrial engineers and core team members to develop the Job Element Sheet (JES)/Standard Operation Sheet (SOS) for each manufacturing operation. Development of the JES/ SOS begins during the Integration Vehicle builds of the Lead SUP program. Preliminary JES/SOS, which is generated at the plant, is needed for the MCB builds. The MPD's are continuously updated by the MPD Group.

Status updates will be provided by regional MPD Managers upon request.

Timing: *Starts: (71) weeks before SORP – Ends: (66) weeks before SORP*

Check List:

1. *Level 2 Math Data is available for all Production released parts at 100% IVER*
2. *GPDS specification usages are "P" released*
3. *Complete set of MPD's provided to the Assembly Plant*

Reference:

1. *MPD Work Instruction (see website address in **Appendix C**)*
2. *View released MPD's in EDM*

B21. Develop Vehicle Sales Service & Marketing (VSSM) Vehicle Launch Plan

Execution Responsibility: *Divisional Product Manager*

Description: *The Marketing (Vehicle) Launch Plan consists of four stages:*

Phase I: Pre-Planning
Phase II: Planning
Phase III: Development
Phase IV: Execution

This element deals with Phase I and Phase II. Marketing vehicles are a key element in every launch, and all vehicles needs should be captured early as part of the launch template. As part of these needs, the VSSM launch team should comprehend and budget for non-saleable vehicles such as PPV and MVBns in the beginning of their marketing plan process. This plan must be coordinated with the Launch Team's Manufacturing Validation and Acceleration Build Plans. Certain elements of this plan may be reviewed as part of the Market Validation Review.

The Market Validation Review (MVR) is at -52 weeks to update key VSSM deliverables, since CSO, with focus on net sale / volume and their effect on ACM (Aggregated Contribution Margin) and business case. The items discussed at MVR are:

1. *Launch Events Calendar (Reveal Plans)*
2. *Updated content/trim strategies/option packaging & mix, complexity*
3. *Updated Product Program Content (PPC)*
4. *Updated Volumes*
5. *Updated Aggregated Contribution Margin (ACM) / Business Case*
6. *Approved Pricing & Incentives*
7. *VSSM deliverables readiness summary*

Timing: *Starts: (78) weeks before SORP – Ends (52) weeks before SORP*

Check List:

1. *Identify Marketing Vehicle Needs*
   - *1.1 Product Process Validation Vehicles (PPV)*
   - *1.2 Non-Saleable Units prior to Reveal*
   - *1.3 Non-Saleable Units at Reveal*
   - *1.4 Saleable*
     - *1.4.1 Ride-and-Drive Training/Dealership Events*
     - *1.4.2 Long Lead/Magazines*
2. *Develop Export Strategy*
3. *Address Service operation and brand quality issues*
4. *Develop Regular Prodcution Option (RPO)/Limited Personalization Options (LPO) Strategy*
5. *Determine Launch Cadence*
6. *Develop Packaging and Options*
7. *Establish and Refine Distribution Strategy*
8. *Develop Communications Schedule*
9. *Establish Launch War Room*
10. *Develop Lifecycle Communications Plan*
11. *Develop Autoshow Strategy*
12. *Develop Retail Advance Product Guide*
13. *Conduct Immersion Day*
14. *Determine Dealer Reveal Cadence*
15. *Develop Promotion Strategy*
16. *Support Employee Enthusiasm Plan*

Deliverables:

1. *Launch Events Calendar – Reveal Plans (GVDP 10630)*
2. *Promotional & Merchandising Plans (GVDP 10333)*
3. *Product Information & Communications Plan (GVDP 10783)*
4. *Vehicle Training (GVDP 10784)*
5. *Communications Strategy and Deliverables (GVDP 10335)*

Reference:

1. *VSSM Vehicle Launch Process Manual*
2. *GMU # 20612 Marketing Global Launch Process*
3. *GMU # 22801 Elements of Launch*

B22. Develop Supply Chain Part Plan *(formerly PFEP)*

Execution Responsibility: Material Launch Manager, *Material Center Coordinator*

Description: Each part must have a complete plan, which describes how the part will be delivered and displayed in the production environment. *The KD Source Plant must provide a Master Parts List (MPL) and a Supplier Parts List (SPL) to the CKD Receiver Plant to enable this planning activity.* A Supply Chain Part Plan is the result of a material planning process that identifies/creates a detailed plan for every part for all aspects of the material flow system. It includes the following major areas required to take each part from the supplier to the line side delivery:

2. Supplier to Dock:
- 1.1. Containerization
- 1.2. Logistics
- 1.3. 3rd Party
- 1.4. Dock Assignment

3. Dock to Operator:
- 2.1. Material Flow
- 2.2. Material Area Layouts
- 2.3. Production Part Storage
- 2.4. SPO Part Storage
- 2.5. Line-Side Delivery

Timing: *Starts: DSI – Ends: CSO (Strategy Planning)*
Starts: (-144) weeks before SORP – Ends: EOA (Execution Planning)

Check List:

1. Supplier to Dock:
   - 1.1. Container size and standard pack identified
   - 1.2. Sequence / Repack container size and standard pack noted
   - 1.3. Transportation Mode Identified
   - 1.4. Logistics Operational Analysis
   - 1.5. 3rd Party Launch Plan Created
   - 1.6. Receiving Dock Identified
2. Dock to Operator
   - 2.1. Delivery Location (DLOC) determined
   - 2.2. SPO Storage Location Determined
   - 2.3. Pull signal method established
   - 2.4. Internal Delivery Method Identified
   - 2.5. Line-side Presentation Planned
   - 2.6. Stockman Identified
3. Part Check-in/Check-out process to control material during MVB. (See “Hand Delivery of Parts” form on Launch Team Website.)

Reference:

1. Supply Chain Part Planning Users Manual

B23. Develop and Communicate Employee Participation Plan

Execution Responsibility: *Plant Launch Manager/Plant Communications Integrator*

Description: *Future product protection and security is a critical element of GM’s ability to succeed in the marketplace. Marketing goals may be compromised by unauthorized photography and information loss if made public without GM’s consent.*

The initial builds (PPV and MVBs) of General Motors future products are valuable and confidential assets that must be kept confidential until they are ready to be revealed. Therefore, the Business Unit Owner – GM Marketing Division or Business Unit that ordered the vehicle has responsibility for the property and are responsible keeping the vehicles covered and confidential. All future products must be identified with a permanently affixed red and yellow key tag which is "hard wired" to vehicles keys at Show Vehicle Operations immediately after it is received for initial prep. The tag must stay with the keys until vehicle has been revealed to public or marketing team directs a change in classification and tag removal. All vehicles with this tag must be covered at all times when not in authorized use. Covers are provided to " Show Vehicle Operations" through authorization from the Marketing Team who "owns" the vehicle and must accompany the future product at all times until it has been officially revealed to the general public.

Develop specific plans to involve all employees in the launch process to generate enthusiasm and to utilize everyone's skills and knowledge. The objective is to generate a "whatever-it-takes" attitude and "esprit de corps" to ensure a successful launch.

Employee involvement and enthusiasm plans essentially focus on the people side of the business. Successful production launches recognize this as a key success factor. The following factors should be included in the plan:

- An attitude supporting Saleability of vehicles as soon as possible
- *Focus on quality*
- *Focus on workforce readiness*
- *"PR"/ Enthusiasm Campaign/Workforce pride and ownership*
- *Communication plan for entire program*
- *Sense of team spirit and shared goals*

The roll-out of the production launch plan is communicated to plant employees and anyone supporting the launch that isn't already informed about the launch plans. By this point in the program, this should be a small group of people.

A program launch website is set up and maintained by a launch team member (see Appendix S). The website contains all relevant program information approved by the Launch Manager.

Timing: *Starts: (74) weeks before SORP – Ends: (52) weeks before SORP*

Check List:

1. *Communication Plan complete*
   - *1.1. Videos*
   - *1.2. Mailings*
   - *1.3. Newsletter articles*
   - *1.4. Status Reports*
2. *Employee Static Vehicle Evaluation Program defined*
   - *2.1. Videos*
   - *2.2. Mailings*
3. *In-plant displays planned*
4. *Employee Dynamic Vehicle Evaluation Program defined.*
   - *4.1. On-site drive*
   - *4.2. Overnight drive*
5. *Rollout schedule determined*
   - *5.1. Assess coverage of audience*
   - *5.2. Check for results*
6. *Expenses are incorporated in Manufacturing Expense Budget (element A7)*

C. Training

C1. *Develop & Implement Plant Launch Training Plan*

Execution Responsibility: Plant Launch Training Manager

Description: A Launch Training Plan (LTP) is developed for all programs that have been defined as a "launch" by the Global Launch Process Team. This LTP includes the training necessary for the entire plant population to safely and successfully launch the new product.

One important aspect of the LTP is Technical Training. It is imperative that the correct technical training course requirements are identified. This is the function of the Manufacturing Engineering (ME) Technical Training Integrators (TTI). The next step is to identify the appropriate people who will attend the technical training courses. The courses must then be scheduled and delivered.

The training plan development will follow the GM Common Vehicle Launch Training Process and utilize the associated common tool set. The Global Manufacturing System/Industrial Engineering (GMS-IE) Team owns the process.

The Launch Training Team will be staffed with a qualified, experienced, full time Launch Training Manager and supported by others as determined by the plant. The team develops and implements the Launch Training Plan. Implementation must follow the common Vehicle Launch Training Process and include the skilled trades Structured on the Job Training (SOJT) requirements defined by ME/Manufacturing. It is important that the Plant Launch Training Team understands and has the qualifications necessary to support the roles and responsibilities as defined. The Launch Training Team will manage, using common tools, all aspects of all training defined in the Launch Training Plan (LTP).

Timing: Starts: (76) weeks before SORP - Ends: *EOA*

Check List*:*
LTP Development
Check List:

1. Develop post Contract Signing Launch Training Cost Forecast.
2. Identify Plant Launch Training resources
   - 2.1 Identify and select Launch Training Core Team
   - 2.2 Train LTP Team on GM Common Launch Process (training completed by GMS/IE)
3. Prepare Launch Training Plan by:
   - 3.1 Getting Training requirements from ME Training Integrators
   - 3.2 Identifying "gap" between current skills and required skills
   - 3.3 Developing the Curriculum Matrix
   - 3.4 Developing the Plant budget for launch training
   - 3.5 Developing curriculum maps for plant personnel
   - 3.6 Identifying work rule issues affecting training
4. Provide data for Federal, State, and Local Funding Source
5. Determine SME Tradesperson requirements
   - 5.1 Jointly define Roles & Responsibilities
   - 5.2 Jointly develop selection criteria
   - 5.3 Jointly develop criteria that allows for participation of SME in system/tooling tryouts at design and build stage
6. Develop Final Launch Training Plan
   - 6.1 Curriculum Matrix
   - 6.2 Course Development Matrix
   - 6.3 Curriculum Maps (Individual Development Plans)

6.4 Instructor, Facility, and Training Equipment Requirements
6.5 Initial LTP implementation and training schedule
6.6 Launch Training Budget Forecast
6.7 Obtain LTP approval by Plant and Program Leadership

7. Identify training backfill strategies to ensure trainees are available for training

LTP Implementation Check List:

1. Project Management
   1.1. Continuously updates the findings in the LTP with current plant data for all elements of the LTP implementation plan (the LTP is a living document)
   1.2. Incorporate Global Vehicle Development Process timing and milestones in the LTP implementation plan
   1.3. Monitor compliance to local plant work rules
   1.4. Set up GM Common Training Information System (CTIS) in Training Plan Administration System (TPAS) to run special reports to track launch training metric of actual training hours versus planned training hours
   1.5. Incorporate Launch Training Master Plan in overall plant master plan, using Master Dot
   1.6. Develop and communicate specific launch training resource requirements
   1.7. Establish a plant launch training steering team, with an established meeting schedule, to provide direction and priorities
   1.8. Develop a “plan for every course” in the LTP
   1.9. Utilize the SOJT Process for skilled trades training
2. Finances
   2.1. Establish funding and budget
   2.2. Track actual Launch Training spending versus planned training cost
   2.3. Process Purchase Order for all training development and delivery
3. Communications
   3.1. Develop a training communication plan as part of plant master plan
   3.2. Establish a weekly PLM reporting process with the Plant Launch Team
   3.3. Develop a Launch Training Wall to capture all major elements of the launch training plan in a visual manner
4. Information Systems
   4.1. Establish a Learning Management System (e.g. CTIS, SAP, etc.) requirements to track training project data using TPAS
   4.2. Ensure reports are in common format, produced on time, and readily available
5. Training Delivery
   5.1. Develop Master Launch Training Schedule and post in training work area for all courses identified in LTP
   5.2. Develop reports to communicate resource utilization and future requirements
   5.3. Verify all external instructors are certified to teach selected subject matter with performance evaluated
   5.4. Ensure all internal instructors are plant selected and status tracked using flexibility charts
   5.5. Publish training schedules in a timely manner directly to each department
6. Library
   6.1. Collect courseware and organize for re-use as needed anywhere within General Motors
   6.2. Collect Technical Manuals and reproduce as required to support training delivery
7. Evaluation

7.1. Ensure course evaluation data are collected, analyzed, and used for continuous improvement initiatives
7.2. Conduct LTP calibrations to ensure primary training processes are functioning properly
7.3. Complete Closeout Report and provide to LTP process owners (Global Manufacturing System / Industrial Engineering), plant staff, and the Plant Launch Manager (PLM) and Team.

8. Administration
   8.1. Establish data management techniques to minimize manual effort
   8.2. Ensure communications are clear, crisp, and timely
   8.3. Ensure distribution lists are established to streamline communications

C2. Complete Launch Team Bill of Training

Execution Responsibility: *Plant* Launch Manager/Production Launch Team

Description: *In all aspects of our company activities, 'SAFETY IS THE OVERRIDING PRIORITY'. Specific precautionary measures should be confirmed prior to launch team residence at the assembly plant. All launch team members should receive extensive safety training relative to plant and launch specific requirements. Assembly plants typically undergo extensive facility construction during launch, and safety hazards will be abundant. Any plant employee that may be exposed to safety hazards that are not typical of operations should be trained and held accountable to the proper precautions. This may entail safety hats for all employees, specific classroom training, steel-toed safety footwear, etc. Any unsafe act or condition should be immediately corrected and communicated within the organization. It is critical that all launch team members be aware of their surroundings. Any incident or injury should be thoroughly investigated and communicated using the appropriate General Motors procedures.*

The Plant Launch Manager (PLM) is responsible for the development of the Launch Team in preparation for the product launch and to include safety precautions. Using the Launch Process Team "Bill of Training" as a guide, the PLM will determine what specific training is required or optional. ***The Global Launch Process (GLP) course is an example of required training for all Launch Team and support members, as this training course is a prerequisite to participate in the GLP Workshop.***

Timing: Start: (78) weeks before SORP
Ends: (72) weeks before SORP

Check List:

1. *Orientation to local safety program*
   1.1. Contractors
   1.2. All Launch team members and support
   1.3. Suppliers
   1.4. Other non-local personnel
2. *Certification of safety protocol program*
3. *Application specific program content training (i.e. Hybrid safety training)*
4. *MSDS, Safety lockout, hazardous materials, etc.*
5. *Identify participants and Bill of Training requirements*
6. *Confirm class timing, location availability and participation*

Specific precautionary measures should be confirmed prior to launch team residence at the assembly plant. All launch team members should receive extensive safety training relative to plant and launch specific requirements. Assembly plants typically undergo extensive facility construction during launch, and safety hazards will be abundant. Any plant employee that may be exposed to safety hazards that are not typical of operations should be

trained and held accountable to the proper precautions. This may entail safety hats for all employees, specific classroom training, steel-toed safety footwear, etc. As with any aspect of our company, 'SAFETY IS THE OVERRIDING PRIORITY'. Any unsafe act or condition should be immediately corrected and communicated within the organization. It is critical that all launch team members be aware of their surroundings. Any incident or injury should be thoroughly investigated and communicated using the appropriate General Motors procedures.

Reference:

1. Global Launch Process Training Description (see **Appendix O**)
2. Launch Team Bill of Training Corporate Safety Requirements
3. Launch Construction Safety Procedures

1. Identify target audience
2. Class availability confirmed
3. Participants enrolled in classes

3. *Identify and capture all remaining open issues regarding execution of the Program MVB Plan*

GLP Execution Workshop (Section D and E)

The GLP Execution Workshop focuses on applying Global Launch Process to all GM vehicle programs. The workshop is designed to review, analyze and integrate the program specific launch plans that satisfy elements of sections D and E of the Global Launch Process.

In the Execution Workshop, Plant Launch Teams should be prepared to discuss the team's progress on change management and issue resolution information listed below.

1. *IRT Functional Alignment Status*
   1.1 Wind/Water and Squeak/Rattle Co-Chairs
2. *Launch CAB Process*
   2.1 Timing
   2.2 TWO's
   2.3 Meeting Schedule
3. *Issue Tracking Process*
   3.1 PRTS+
4. *Parts checker follow-up*

Timing:

GLP Planning Workshop	*Starts: (74 to 70) weeks before SORP*
MVB Workshop	*Starts: (64 to 60) weeks before SORP*
GLP Execution Workshop	*Starts: (52 to 48) weeks before SORP*

Check List:

1. *GLP Best Practice Website for examples plans*
2. *Identify target audience (reference Plant Launch Team Template)*
3. *Facilitator(s) identified/qualified*
4. *Workshop goals, objectives, and materials finalized*
5. *Pre-workshop preparation meetings complete*
6. *Production Launch Plan developed using the appropriate Best in Class Template*
7. *Obtain MVB templates*
8. *Review GLP " Develop Manufacturing Validation Build Plan"*
9. *Obtain customer requirements prior to the Workshop*
10. *Program Quality Plan*
11. *In-Plant Quality Plan for MVB*
12. *Material Readiness Plan*
13. *Operator Training Plan*
14. *Manufacturing Process Implementation Plans*
15. *Build Progression Strategy*
16. *Marketing Plan*
17. *GSC Requirements, Order Freeze date*
18. *Die timing*
19. *Launch Performance Targets*
20. *Key Milestone Events*
21. *PPAP Status and Target Dates*

Reference:

1. *GLP Training Materials*
2. *PPV Build Manual on website (see address in **Appendix C**)*
3. *GSC Manufacturing Validation Benchmark timing chart*
4. *CTIS #16951 Global Launch Process Workshop Description (**Appendix P**)*

D. Plant Preparation

D1. CKD Receiver Plant Process Review @ CKD Source Plant

Execution Responsibility: *Plant Launch Manager (Receiver Plant)*
CKD Launch Manager (Source Plant)

Description: CKD Source Plant ME needs to organize a CKD receiver plant Process review meeting at the Source Plant location. The purpose of the meeting is to observe the production build process / sequence in the plant. Identify any special hand tools, jigs, fixtures, or unique operations. The source plant will review the lessons learned, single issues list, key issues, and any potential risk to the CKD Receiver Plants. An additional benefit is to establish relationships with your counterparts in each of the areas (Body, Paint, GA, Quality, etc.) with the Source plant but also the other CKD Receiver Plant people that will be launching the same product.

Timing: (52) weeks before SORP- Ends: (42) weeks before SORP

Check List:

1. Source Plant
   1.1. Master timing chart of CKD Receiver Plant
   1.2. Lessons Learned from the base launch of the program.
   1.3. Lessons Learned from past CKD launches
   1.4. Key issues list
   1.5. Single issues list
   1.6. QAS issues list (Body Shop)
2. Receiver Plant
   2.1. Lessons Learned from past CKD launches
   2.2. Master timing chart
   2.3. Detailed MVB build plan (include IV, Tryout, PPV, MVBns, MVBs, SORP, and EOA projection)

D2. Stamping/Press Shop Readiness

Execution Responsibility: *Receiver Plant Facilities Engineering / Metal Fabrication Launch Manager / Press Shop Launch Manager*

Complete Manufacturing System & Facilities Installation

Description: The manufacturing system is installed and fully integrated into the assembly plant. The conveyors, robots, tools, dies, gauges, etc. are installed. *In addition, all hand tools, part racks, air drops, platforms, minor fixtures and assembly aids are in appropriate places in time to support any on-line builds. Andon hardware (QAS Boards, chords, light, etc.), production marquees, and fixed position stops should be operational. The manufacturing system is made ready for validation.*

Every effort should be made to minimize downtime in the plant by utilizing weekends and holidays to do equipment installations. The timing of the system installation will be dependant on the available installation timing windows and scheduling of the build events. The intent is to have all installations complete prior to *PPV*. It is necessary to define all maintenance activities and that the plant's skilled trades and operators have implemented Production Maintenance Partnership during the installation phase.

A vehicle or mock up is run through the plant conveyor systems for the purpose of physical validation of conveyor clearance and other facility issues. Although dimensionally correct hardware parts are preferred, templates can be used to verify facility contact points. It is crucial that all build combinations that change the dimensional conveyor clearances be considered for this activity. It should be repeated as often as necessary. All clearances both in plant and haul away facilities (rail & truck) must be evaluated.

This element should cover the Source Plant installation/preparation requirements in order to be capable to ship/deliver the parts according to the knockdown agreements. This may also require additional volume levels.

Timing: *Ends: (35) weeks before SORP*

Check List:

1. Manufacturing system is installed according to installation layout and plan including:
   - 1.1. Conveyors, robots, tools, and minor fixtures
   - 1.2. Part racks, platforms, hand tools
   - 1.3. Body fit hand tools and assembly aids available
   - 1.4. Area lighting and Operator utility accessories
   - 1.5. Line address signs, Operator Certification Boards, and visual controls
   - 1.6. Error-proofing and Torque monitoring equipment
   - 1.7. Electronic Pull System Pendants and radio frequency equipment
2. *A full-time contract safety engineer on site*
3. Daily construction meetings
4. Dynamic Vehicle Test (DVT), Water Booth, Weld Destruct Booth, and Squeak & Rattle Simulator ready
5. Manufacturing system integration (hardware and software) completed
6. Production Maintenance (PM) plan defined, TPM ready to start
7. Production Maintenance Partnership visuals in place
8. Equipment spare parts available and ME spare parts process followed
9. Standard Checklist is complete and linked in MAXIMO *or plant local tracking system*
10. *System for dimensional data measuring and data collection established*
11. *Tooling/engineering drawings media defined for plant hand-off with latest changes*
12. *Plant storage of engineering drawings ready*
13. All technical documentation available
14. *Plan is tracked using Master Dot*
15. Report status at Manufacturing Validation PQRR Review
16. Launch Training Plan has all necessary technical training executed
17. Manufacturing system is ready for Manufacturing Validation Builds
18. *Validate the interface between all production intent shipping containers and production tooling prior to the first in-plant build event (PPV/MVB).*
19. *Validate transportation modes for adequate clearance for all body styles.*
20. *Conveyor clearances and other facility issues checked and corrected utilizing dimensionally representative production vehicles for all body styles.*
21. *Check for weight limitations on conveyors against new product load.*

Reference:

1. Manufacturing system installation plan

Execute Stamping / Press Shop Tryout

Description: *The purpose of the in-plant Manufacturing System and Subsystems Tryout is to determine whether tooling designs, conveyors, carrier details, and robot programs are process feasible for Manufacturing Validation Builds, prior to the Start of Regular Production. This takes place in the assembly plant. Material used for these builds are the same as those currently in production. (Note: If new materials are to be released, they will be evaluated and approved separately.) In the situation where normal Body Parts are assembled in General Assembly, the tryout plans need to reflect this change.*

Maintenance Readiness is validated during the tryout phase. Maximo should be populated, all spares delivered and technical training finalized.

The manufacturing engineering purpose is to check production aid designs for functionality; robot programs for process feasibility; conveyors and carrier details for functionality and process feasibility; and assembly operations for safety, ergonomics, and cycle time in a production environment during production vehicle validation and non-saleable manufacturing validation build events. The planned production assembly process at the assembly plant is used for the tryouts. Bodies must be shipped through the process on carriers that has the required details.

Each part must have a detailed plan with timing, which describes the activities necessary to provide the right quantity of parts, at the right time, in the right place for Manufacturing Validation and production builds. The Supply Chain Part Planning element provides a base plan for this activity.

Execution of the material flow plan during Manufacturing Validation Builds allows for an evaluation and management of material availability risk. Material availability is defined as the overall assessment of part delivery to the production operator, delivery of parts to the service parts warehouse, and the capability to meet program launch timing and cost objectives. Material availability is a key element of production readiness. Availability of service parts is a key element of overall readiness and Total Customer Enthusiasm (TCE).

If the production launch involves a Logistics Optimization Center (LOC), particular attention needs to be paid to validating the material flow. Assess Vehicle Transportation Plan using build of these vehicles.

The first body built that represents production intent will be held in a Body Shop offline area to allow General Assembly operators sufficient time to install and evaluate, interior and exterior trim part attachment point interface problems. If Body or GA rework is required, it must be done prior to shipping the body. It may be beneficial to repeat this process with each significant vintage of required material parts. It is also suggested that the Paint Shop use this opportunity to review the unit and note items that may need repaired, such as "Rat Holes/Open Seams", prior to shipment.

Timing: *Starts: (45) weeks before SORP*
Ends at End of Acceleration

Check List:

1. Tryout responsibilities identified:
1.1. Stamping/Press Shop
1.2. Plastic Shop

1.3. Paint Shop
1.4. General Assembly
1.5. Material
1.6. Quality

2. *Process capability assessed*
   2.1. Preliminary tool repeatability and reproducibility established
   2.2. Tooling throughput bottlenecks identified
   2.3. Cycle time verified
   2.4. Error proofing verified
   2.5. Gauging requirements in place
   2.6. Data collection and reporting systems
3. *Build quality issues identified and resolved*
4. *Tools and equipment designs assessed - Workability for loading and unloading verified*
   4.1. Compatibility with automation verified
   4.2. Production aid functionality verified
   4.3. Conveyor clearances verified
   4.4. Carrier detail design functionality and process feasibility verified
5. *Safety and ergonomics issues in the production environment identified and resolved*
6. *Operator Readiness*
7. *Training defined in the Launch Training Plan complete or scheduled for completion*
8. *Job instruction finalized and complexity established*
9. *Simulation or floor experience for "hands on" repetition with leaders, coordinators, and operators*
10. *"Hands on" repetitions during Manufacturing Validation Builds on all shifts/crews*
11. *Operator Readiness is tracked on flexibility charts*
12. *Engineering information verified*
    12.1. Part release
    12.2. Master Process Plans
    12.3. Program Dimensional Plan
    12.4. Weld documentation (Process Data Sheets, templates, Weld Pattern and weld appearance requirements)
13. *Customs requirements identified for shipping equipment and materials across international borders*
14. *Parts Ordering Process*
15. *Metal Center content = PPI/EMS; Outside Suppliers (non-metal center content) = GSC/MGO*
16. *Product Quality standard issues identified and resolved*
17. *Customs requirements identified for shipping equipment and materials across international borders*
18. *Verification stations, CARE, IRC, Global Customer Audits, Monitoring, Water Booth, Squeak and Rattle, Simulator, and Squeak and Rattle*
19. *Evaluation track tryout*
20. *Facilities Layouts*
21. *Container Validation*
22. *SPO Material Process*
23. *T – event process*

Reference:

1. *GM Integrated Manufacturing Process (IMP)*
2. *GMNA Paint*
3. *Manufacturing Quality Plan*
4. *Problem Documentation Worksheets*

5. *GMNA Material Flow Reference Manual*
6. *Global Manufacturing System*

Complete Operation Readiness and Certification (GMS Workstation Readiness)

Description: Operation Readiness and Certification is a standardized process that utilizes the Plan, Do, Check, Act principles which verify workstations and processes are set up properly, and provides a method to measure and track plant readiness. This process applies to production and other area that have people working in teams. (Press, Body, Paint, GA, Material/Logistic and Quality) Workstations should be simulated in the plant's Operator Support Center.

- To ensure the desired level of workstation readiness (including assembly, inspection, and repair) for all major events (i.e. e. start-up, line speed changes etc.)
- To ensure that *Team Member* Certification is complete so that the operator is capable of performing all work elements safely at the highest level of quality and productivity
- To provide the management with a visual method of determining workstation readiness
- To provide a process for problem solving and rapid corrective action

The Operational Readiness Process is used to verify that each workstation meets all requirements. It is a process used to verify that work areas have everything required enabling the *team members* to perform their job. It assures that operators are trained on job requirements and are performing according to the intended build process. The result is that work is performed safely at the highest level of quality and productivity.

The Operation Readiness Process provides visual management for gate reviews, based upon the layered audit process, that have been initiated to track the Assembly Plant's Operational Readiness.

Timing: Starts: (24) weeks before SORP – Ends: (8) weeks after SORP

Check List:

1. *Operation certification completed*
2. Operator training ongoing
3. Special fixtures qualified
4. Work area visually defined
5. Area layout complete
6. *Workplace layout complete*
7. *Master Process Plans available and visible*
8. Manifest available
9. Part usage list available
10. Job instruction in place
11. *Standard feature checks verified - cell and operation SOS*
12. Repair procedures in place
13. *Error-proofing (visual controls)*
14. *Problem Documentation Worksheets*
15. Workplace ergonomics checked
16. *Housekeeping procedure ready*
17. *Tools in place*
18. *Material presentation devices ready*
19. *Lock-out procedure in place*
20. Safety procedures in place
21. Process equipment preventative maintenance plan in place
22. *Process equipment qualification completed*

23. *Printers located and functioning*
24. Hand-held scanners and bar-code readers in place and functioning
25. *Systems ready, and UAT complete and approved*

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

Complete Maintenance Readiness and Certification

Description: The Maintenance Readiness and Certification activity provides confirmation that all requirements related to Maintenance Readiness are met. *The focus is to ensure throughput capacities. This will enable Assembly operations to maintain Manufacturing Flexibility and future capacity increases.*

- To ensure that predictive readings are conducted at the build shops and the baseline readings have been taken at the plant
- To ensure that spare parts have been ordered and received
- *To ensure that PM tasking has been entered into Maximo*
- *To ensure that parts information has been entered into Maximo*
- *To ensure completed Standard Checklists are linked in Maximo*
- *To ensure that the project teams have developed Production Maintenance Partnership daily checks, inspection paths and visual aids*
- To provide management with a visual method of determine readiness
- To provide a process for problem-solving and rapid problem resolution
- To provide a process to accelerate the implementation of the Production Maintenance partnership
- *All LTP technical training executed to cover all teams/shifts*

The Work Station Readiness Process is used to verify that each maintenance area meets all requirements. It is a process used to verify that work areas have everything required enabling the operators to perform their job. It assures that operators are trained on job requirements and are performing according to the intended repair procedures. The result is that work is performed safely at the highest level of quality and productivity.

Timing: Starts: (30) weeks before SORP – Ends: @ EOA

Check List:

1. Operation certification completed
2. Operation Readiness Checklist
3. Technical Acceptance Equipment
4. *Maintenance Readiness & Certification*
   - *4.1. Standardization*
     - *4.1.1. Preventive Maintenance instructions available and placed in MAXIMO; TPM-Boards available and on location*
     - *4.1.2. Hard- and Software documentation, including mechanical and electrical drawings available and placed on location.*
   - *4.2. Built-In Quality*
     - *4.2.1. Pre-acceptance by maintenance is complete and OK*
     - *4.2.2. End-acceptance by maintenance is complete and OK*
   - *4.3. People Involvement*
     - *4.3.1. Safety instructions and lock-out layouts available and placed*
     - *4.3.2. Required maintenance training is complete or planned*
   - *4.4. Short Lead Time*
     - *4.4.1. Spare parts list available*
     - *4.4.2. Are required spare parts available?*
   - *4.5. Continuous Improvement*

4.5.1. Lessons learned tracking in place

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

D3. Body Shop Readiness

Execution Responsibility: *Receiver Plant Facilities Engineering / Body Launch Manager*

Complete Manufacturing System & Facilities Installation

Description: Process description same as D1.

Timing: *BIW Ends: (27) weeks before SORP*

Check List:

1. Manufacturing system is installed according to installation layout and plan including:
   - 1.1. Conveyors, robots, tools, and minor fixtures
   - 1.2. Part racks, platforms, hand tools
   - 1.3. Body fit hand tools and assembly aids available
   - 1.4. Area lighting and Operator utility accessories
   - 1.5. Line address signs, Operator Certification Boards, and visual controls
   - 1.6. Error-proofing and Torque monitoring equipment
   - 1.7. Electronic Pull System Pendants and radio frequency equipment
2. *A full-time contract safety engineer on site*
3. Daily construction meetings
4. Dynamic Vehicle Test (DVT), Water Booth, Weld Destruct Booth, and Squeak & Rattle Simulator ready
   - *4.1. Weld Destruct Booth complete prior to Weld Destruct Event 31 (Body Shop Validation/Iterative Matching). Project must include trained staff with appropriate PPE to safely operate tools and equipment. Hand and power tools must be in place to conduct the destructive evaluation of the assemblies.*
5. Manufacturing system integration (hardware and software) completed
6. Production Maintenance (PM) plan defined, TPM ready to start
7. Production Maintenance Partnership visuals in place
8. Equipment spare parts available and ME spare parts process followed
9. Standard Checklist is complete and linked in MAXIMO.
10. *System for dimensional data measuring and data collection established*
11. *Tooling/engineering drawings media defined for plant hand-off with latest changes*
12. *Plant storage of engineering drawings ready*
13. All technical documentation available
14. *Plan is tracked using Master Dot*
15. Report status at Manufacturing Validation PQRR Review
16. Launch Training Plan has all necessary technical training executed
17. Manufacturing system is ready for Manufacturing Validation Builds
18. *Validate the interface between all production intent shipping containers and production tooling prior to the first in-plant build event (PPV/MVB).*
19. *Validate transportation modes for adequate clearance for all body styles.*
20. *Conveyor clearances and other facility issues checked and corrected utilizing dimensionally representative production vehicles for all body styles.*
21. *Check for weight limitations on conveyors against new product load.*

Reference:

1. Manufacturing system installation plan

Iterative Match/Reverify System Function, Body Test and Body Tryout

Description: The Iterative Match, Re-verify System Function, PPV, Body Test, Body Tryout and MVB Non-Saleable events must be integrated to achieve the timing set forth in GVDP 5.0.

For example, the vehicles produced during the Body Test activity are the vehicles that are provided for PPV. The vehicles that are produced during the Body Tryout activities are the vehicles that are provided for the MVB Non Saleable event. Iterative Match evaluation and correction activities are performed on all assemblies prior to shipping to downstream users and are performed before, during (and sometimes after) re-verify system function, body test / PPV, body tryout / MVBNS and MVBS.

Body Test

The purpose of this event is to test the entire body shop system using metal produced with production dies. This event is the first time all the Body Shop tools and equipment run in full automatic, including inter and intra system conveyance. The Body Test event re-verifies system function and may be used by downstream users for further testing and validation. This is a manufacturing event, not a product event, intended to surface body shop problems as a complete system. Assemblies produced may not be structurally sound or dimensionally accurate.

Body Tryout

The purpose of this tryout is to resolve dimensional and weld quality issues for Engineering. The manufacturing purpose is to check tools for functionality, cycle time, safety, and Manufacturing Validation Builds prior to Start of Regular Production (SORP). This takes place in the Assembly Plant, utilizing metal from production dies from home lines. These bodies are used to complete the Non-Saleable Manufacturing Validation Build units. The planned production assembly process is used for Body Shop tryout**.**

Maintenance Readiness is validated during the tryout phase. Maximo should be populated, all spares delivered and technical training finalized.

Body to Trim Attachment Point Validation

The first body built representing production intent will be held in a Body Shop offline area to allow General Assembly operators sufficient time to install and evaluate interior and exterior trim parts in order to ensure there are no attachment point interfaces. If Body or GA rework is required, it must be done prior to shipping the body. It may be beneficial to

Timing:

Body Test
Starts: (32) weeks before SORP – Ends: (25) weeks before SORP

Body Tryout
Starts: (19) weeks before SORP – Ends: (10) weeks before SORP

6-Event Welding System Qualification

Description: *Depending on the knockdown level of metal and welded subassemblies, a program specific weld event must be developed (scaleable). The purpose of 6-event welding system qualification is to validate weld quality and resolve welding issues for Engineering. Qualification is done through a minimum of 6 destructive evaluations of sub-assemblies and assemblies*

from each equipment line, in each production zone in the plant. A complete teardown is required for each of the following body shop events.

- *Reverify System Function (RSF) (Weld Destruct Event 1)*
- *Product Process Validation (PPV) (Weld Destruct Event 2)*
- *Manufacturing Validation Build Non-Saleable (MVBns) (Weld Destruct Event 3)*
- *Manufacturing Validation Build Saleable (MVBs) (Weld Destruct Event 4)*
- *Start of Regular Production (SORP) (Weld Destruct Event 5)*
- *End of Acceleration (EOA) + 6 Weeks (Weld Destruct Event 6)*

This takes place in the Assembly Plant, utilizing metal from production dies from home lines. These bodies are part of the Iterative Matching process and must be accounted for in the Manufacturing Validation Build units.

Timing: *Starts: Reverify System Function*
Ends: EOA + 6 weeks

Objectives:

1. *Safety*
2. *Throughput*
3. *Controls, Conveyors, Robotics & Welding (CCRW)*
4. *Dimensional*
5. *Surface*
6. *Welding (Ready to perform 6-Event Welding System Qualification)*
7. *Torque*
8. *Sealing*
9. *Option Verification*

Reference:

1. For additional information, please reference the (MV1) BIW Manufacturing Validation Standard (see website address in Appendix C)
2. *WS-4A (see Appendix C)*

Check List:

1. Process capability assessed
2. Build quality issues identified and resolved
3. Tools and equipment checked for cycle time
4. Safety/ergonomics issues in the production environment identified and resolved
5. Operator Readiness
6. Engineering information verified
7. Customs requirements identified for shipping equipment and materials
8. Parts Ordering Process

Complete Operation Readiness and Certification (GMS Workstation Readiness)

Description: Process description same as D1.

Timing: Starts: (24) weeks before SORP – Ends: (8) weeks after SORP

Check List:

1. *Operation certification completed*
2. Operator training ongoing
3. Special fixtures qualified
4. Work area visually defined
5. Area layout complete
6. *Workplace layout complete*

7. *Master Process Plans available and visible*
8. Manifest available
9. Part usage list available
10. Job instruction in place
11. *Standard feature checks verified - cell and operation SOS*
12. Repair procedures in place
13. *Error-proofing (visual controls)*
14. *Problem Documentation Worksheets*
15. Workplace ergonomics checked
16. *Housekeeping procedure ready*
17. *Tools in place*
18. *Material presentation devices ready*
19. *Lock-out procedure in place*
20. Safety procedures in place
21. Process equipment preventative maintenance plan in place
22. *Process equipment qualification completed*
23. *Printers located and functioning*
24. Hand-held scanners and bar-code readers in place and functioning
25. *Systems ready, and UAT complete and approved*

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

Complete Maintenance Readiness and Certification

Description: Process description same as D1.

Timing: Starts: (30) weeks before SORP – Ends: @ EOA

Check List:

1. Operation certification completed
2. Operation Readiness Checklist
3. Technical Acceptance Equipment
4. *Maintenance Readiness & Certification*
   - *4.1. Standardization*
     - *4.1.1. Preventive Maintenance instructions available and placed in MAXIMO; TPM-Boards available and on location*
     - *4.1.2. Hard- and Software documentation, including mechanical and electrical drawings available and placed on location.*
   - *4.2. Built-In Quality*
     - *4.2.1. Pre-acceptance by maintenance is complete and OK*
     - *4.2.2. End-acceptance by maintenance is complete and OK*
   - *4.3. People Involvement*
     - *4.3.1. Safety instructions and lock-out layouts available and placed*
     - *4.3.2. Required maintenance training is complete or planned*
   - *4.4. Short Lead Time*
     - *4.4.1. Spare parts list available*
     - *4.4.2. Are required spare parts available?*
   - *4.5. Continuous Improvement*
     - *4.5.1. Lessons learned tracking in place*

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

D4. Paint Shop Readiness

Execution Responsibility: *Receiver Plant Facilities Engineering / Paint Launch Manager*

Complete Manufacturing System & Facilities Installation

Description: Process description same as D1.

Timing: *Ends: (27) weeks before SORP*

Check List:

1. Manufacturing system is installed according to installation layout and plan including:
   1.1. Conveyors, robots, tools, and minor fixtures
   1.2. Part racks, platforms, hand tools
   1.3. Body fit hand tools and assembly aids available
   1.4. Area lighting and Operator utility accessories
   1.5. Line address signs, Operator Certification Boards, and visual controls
   1.6. Error-proofing and Torque monitoring equipment
   1.7. Electronic Pull System Pendants and radio frequency equipment
2. *A full-time contract safety engineer on site*
3. Daily construction meetings
4. Dynamic Vehicle Test (DVT), Water Booth, Weld Destruct Booth, and Squeak & Rattle Simulator ready
5. Manufacturing system integration (hardware and software) completed
6. Production Maintenance (PM) plan defined, TPM ready to start
7. Production Maintenance Partnership visuals in place
8. Equipment spare parts available and ME spare parts process followed
9. Standard Checklist is complete and linked in MAXIMO.
10. *System for dimensional data measuring and data collection established*
11. *Tooling/engineering drawings media defined for plant hand-off with latest changes*
12. *Plant storage of engineering drawings ready*
13. All technical documentation available
14. *Plan is tracked using Master Dot*
15. Report status at Manufacturing Validation PQRR Review
16. Launch Training Plan has all necessary technical training executed
17. Manufacturing system is ready for Manufacturing Validation Builds
18. *Validate the interface between all production intent shipping containers and production tooling prior to the first in-plant build event (PPV/MVB).*
19. *Validate transportation modes for adequate clearance for all body styles.*
20. *Conveyor clearances and other facility issues checked and corrected utilizing dimensionally representative production vehicles for all body styles.*
21. *Check for weight limitations on conveyors against new product load.*

Reference:

1. *Manufacturing system installation plan*

Paint Shop Tryout

Description: *The purpose of the in-plant Paint System Tryout is to determine whether paint tooling designs, conveyors, carrier details, and sealer / paint robot programs are process feasible for Manufacturing Validation Builds, prior to the Start of Regular Production. This takes place in the assembly plant. Material used for these builds are the same as those currently in production. (Note: If new materials are to be released, they will be evaluated and approved separately.) New colors, primers, sealers, or adhesives will follow their development and validation procedures above and beyond these requirements. The bodies for Paint Tryout are used to*

support the Non-Saleable Manufacturing Validation Build event. The Planned assembly process is used for the Paint Tryout.

Maintenance Readiness is validated during the tryout phase. Maximo should be populated, all spares delivered and technical training finalized.

The manufacturing engineering purpose is to check production aid designs for functionality; sealer/paint robot programs for process feasibility; conveyors and carrier details for functionality and process feasibility; and assembly operations for safety, ergonomics, and cycle time in a production environment during production vehicle validation and non-saleable manufacturing validation build events. The planned production assembly process at the assembly plant is used for the paint system tryouts.

Requirements:

- *Paint process bodies through the entire paint system. Bodies must be shipped to the Paint Shop from body shop on a carrier that has the required details.*
- *Assumption is that the processes required for paint and sealing the vehicle are in compliance or compatible with the Paint Bill of Process. Any Bill of Process deviations must be addressed.*
- *Production approved substrates, drawing compounds, and lubricants must be on all parts incoming to the Paint Shop to prevent system downtime due to contamination. All parts must be free of inks, dyes, or other stray markings to ensure quality finish and prevent excess cleanup time.*
- *All materials and parts intended for application or installation in the Paint Shop must be approved and delivered directly to paint prior to the scheduled vehicle build.*
- *Robot path programming and facilities revisions must be in place to ensure that timing requirements are met for paint and seal processing.*
- *Manpower to support new program launches must be in place to ensure that timing requirements are met for paint and sealing processing.*
- *Sufficient time must be included in the build schedule of each vehicle to enable to the following Paint Shop activities to occur.*
    - *Operator Training*
    - *Confirmation of body clearances through system*
    - *Sealing process validation*
    - *Equipment tune-in/robot path validation*
    - *Repair path development and validation*
    - *Verification of film builds for ELPO, prime, and topcoat*
    - *Vehicle fluid drainage verification*
    - *Production aid validation*
    - *System line balance*
- *Two Body Test vehicles per color per model shall be provided to the Paint Shop for robotic paint path optimization prior to Manufacturing Validation – Saleable builds.*
- *Delivery of vehicles form Paint to General Assembly can be achieved within required operating window if the above requirements are met.*

Timing: *Starts: (40) weeks before SORP*
Ends at End of Acceleration

Check List:

1. *Tryout responsibilities identified:*

1.1. Stamping/Press Shop
1.2. Plastic Shop
1.3. Paint Shop
1.4. General Assembly
1.5. Material
1.6. Quality

2. *Process capability assessed*
   2.1. Robot programs verified
   2.2. Cycle times verified
   2.3. Error proofing verified
   2.4. Manual sealing operations verified
   2.5. Paint/Sealer cure verified
   2.6. Phosphate/ELPO drainage verified
   2.7. Film build verified
3. *Build quality issues identified and resolved*
4. *Tooling designs assessed*
   4.1. Workability for loading and unloading verified
   4.2. Compatibility with automation verified
   4.3. Production aid functionality verified
   4.4. Conveyor clearances verified
   4.5. Carrier detail design functionality and process feasibility verified
5. *Safety and ergonomics issues in the production environment identified and resolved*
6. *Operator Readiness*
   6.1. Training defined in the Launch Training Plan complete or scheduled for completion
   6.2. Job instruction finalized and complexity established
   6.3. Operator Readiness is tracked on flexibility charts
7. *Simulation or floor experience for "hands on" repetition with leaders, coordinators, and operators*
8. *"Hands on" repetitions during Manufacturing Validation Builds on all shifts/crews*
9. *Engineering information verified*
   9.1. Part release
   9.2. Master Process Documents
   9.3. Program Dimensional Plan
   9.4. Weld documentation (Process Data Sheets, templates, Weld Pattern and weld appearance requirements)
10. *Customs requirements identified for shipping equipment and materials across international borders*
11. *Parts Ordering Process*
12. *Metal Center content = PPI/EMS; Outside Suppliers (non-metal center content) = GSC/MGO*
13. *Product Quality standard issues identified and resolved*
14. *Customs requirements identified for shipping equipment and materials across international borders*
15. *Verification stations, CARE, IRC, Global Customer Audits, Monitoring, Water Booth, Squeak and Rattle, Simulator, and Squeak and Rattle*
16. *Evaluation track tryout*
17. *Facilities Layouts*
18. *Container Validation*
19. *SPO Material Process*

Reference:

1. *GM Integrated Manufacturing Process (IMP)*
2. *GMNA Paint*

3. *Manufacturing Quality Plan*
4. *Problem Documentation Worksheets*
5. *GMNA Material Flow Reference Manual*
6. *Global Manufacturing System*

Complete Operation Readiness and Certification (GMS Workstation Readiness)

Description: Process description same as D1.

Timing: Starts: (24) weeks before SORP – Ends: (8) weeks after SORP

Check List:

1. *Operation certification completed*
2. Operator training ongoing
3. Special fixtures qualified
4. Work area visually defined
5. Area layout complete
6. *Workplace layout complete*
7. *Master Process Plans available and visible*
8. Manifest available
9. Part usage list available
10. Job instruction in place
11. *Standard feature checks verified - cell and operation SOS*
12. Repair procedures in place
13. *Error-proofing (visual controls)*
14. *Problem Documentation Worksheets*
15. Workplace ergonomics checked
16. *Housekeeping procedure ready*
17. *Tools in place*
18. *Material presentation devices ready*
19. *Lock-out procedure in place*
20. Safety procedures in place
21. Process equipment preventative maintenance plan in place
22. *Process equipment qualification completed*
23. *Printers located and functioning*
24. Hand-held scanners and bar-code readers in place and functioning
25. *Systems ready, and UAT complete and approved*

Reference:

1. *Global Manufacturing System: 14.1 Operation Readiness*

Complete Maintenance Readiness and Certification

Description: Process description same as D1.

Timing: Starts: (30) weeks before SORP – Ends: @ EOA

Check List:

1. Operation certification completed
2. Operation Readiness Checklist
3. Technical Acceptance Equipment
4. *Maintenance Readiness & Certification*
   - *4.1. Standardization*
     - *4.1.1. Preventive Maintenance instructions available and placed in MAXIMO; TPM-Boards available and on location*
     - *4.1.2. Hard- and Software documentation, including mechanical and electrical drawings available and placed on location.*
   - *4.2. Built-In Quality*
     - *4.2.1. Pre-acceptance by maintenance is complete and OK*
     - *4.2.2. End-acceptance by maintenance is complete and OK*

4.3. People Involvement
4.3.1. Safety instructions and lock-out layouts available and placed
4.3.2. Required maintenance training is complete or planned
4.4. Short Lead Time
4.4.1. Spare parts list available
4.4.2. Are required spare parts available?
4.5. Continuous Improvement
4.5.1. Lessons learned tracking in place

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

D5. General Assembly Readiness

Execution Responsibility: *Receiver Plant Facilities Engineering / GA Launch Manager*

Complete Manufacturing System & Facilities Installation

Description: ***Process description same as D2.***

Timing: *GA Ends: (25) weeks before SORP*

Check List:

1. Manufacturing system is installed according to installation layout and plan including:
   1.1. Conveyors, robots, tools, and minor fixtures
   1.2. Part racks, platforms, hand tools
   1.3. Body fit hand tools and assembly aids available
   1.4. Area lighting and Operator utility accessories
   1.5. Line address signs, Operator Certification Boards, and visual controls
   1.6. Error-proofing and Torque monitoring equipment
   1.7. Electronic Pull System Pendants and radio frequency equipment
2. *A full-time contract safety engineer on site*
3. Daily construction meetings
4. Dynamic Vehicle Test (DVT), Water Booth, Weld Destruct Booth, and Squeak & Rattle Simulator ready
5. Manufacturing system integration (hardware and software) completed
6. Production Maintenance (PM) plan defined, TPM ready to start
7. Production Maintenance Partnership visuals in place
8. Equipment spare parts available and ME spare parts process followed
9. Standard Checklist is complete and linked in MAXIMO.
10. *System for dimensional data measuring and data collection established*
11. *Tooling/engineering drawings media defined for plant hand-off with latest changes*
12. *Plant storage of engineering drawings ready*
13. All technical documentation available
14. *Plan is tracked using Master Dot*
15. Report status at Manufacturing Validation PQRR Review
16. Launch Training Plan has all necessary technical training executed
17. Manufacturing system is ready for Manufacturing Validation Builds
18. *Validate the interface between all production intent shipping containers and production tooling prior to the first in-plant build event (PPV/MVB).*
19. *Validate transportation modes for adequate clearance for all body styles.*

20. *Conveyor clearances and other facility issues checked and corrected utilizing dimensionally representative production vehicles for all body styles.*
21. *Check for weight limitations on conveyors against new product load.*

Reference:

1. *Manufacturing system installation plan*

General Assembly Tryout

Description: *The purpose of the in-plant General Assembly Tryout is to resolve GA process and quality issues in the assembly plant prior to SORP. The manufacturing engineering purpose is to assess in-plant GA process capability, tool and equipment functionality, cycle time, safety, ergonomics and error proofing in production environment (using the planned production process and production tools and equipment). Operator training is continued during these builds..*

Body to Trim Attachment Point Validation

The first body build that represents production intent will be held in a Body Shop offline area to allow General Assembly operators sufficient time to install and evaluate, interior and exterior trim part attachment point interface problems. If Body or GA rework is required, it must be done prior to shipping the body. It may be beneficial to repeat this process with each significant vintage of required material parts.

Maintenance Readiness is validated during the tryout phase. Maximo should be populated, all spares delivered and technical training finalized.

Timing: *Starts: (38) weeks before SORP (due to Stamping/BIW)*
Ends at End of Acceleration

Check List:

1. *Tryout responsibilities identified:*
   - 1.1. *Stamping/Press Shop*
   - 1.2. *Plastic Shop*
   - 1.3. *Paint Shop*
   - 1.4. *General Assembly*
   - 1.5. *Material*
   - 1.6. *Quality*
2. *Process capability assessed*
   - 2.1. *Preliminary tool repeatability and reproducibility established*
   - 2.2. *Tooling throughput bottlenecks identified*
   - 2.3. *Cycle time verified*
   - 2.4. *Error proofing verified*
   - 2.5. *Gauging requirements in place*
   - 2.6. *Data collection and reporting systems*
3. *Build quality issues identified and resolved*
4. *Body Shop Trim Attachment Point Validation*
   - 4.1. *Body Shop offline area identified*
   - 4.2. *All safety concerns addressed. Any additional safety training and equipment provided (safety glasses, footwear, etc.)*
   - 4.3. *Interior and exterior trim parts identified and ordered*
   - 4.4. *GA operators participating in the build identified*

- *4.5. Necessary tools, facility provisions (air drops, hoists, etc.) arranged*
- *4.6. MPDS's reviewed to establish build sequence*
- *4.7. Build schedule prepared and approved*
- *4.8. Issue identification, recording, resolution and validation process implemented*

5. *Tools and equipment designs assessed - Workability for loading and unloading verified*
   - *5.1. Compatibility with automation verified*
   - *5.2. Production aid functionality verified*
   - *5.3. Conveyor clearances verified*
   - *5.4. Carrier detail design functionality and process feasibility verified*
6. *Safety and ergonomics issues in the production environment identified and resolved*
7. *Operator Readiness*
   - *7.1. Training defined in the Launch Training Plan complete or scheduled for completion*
   - *7.2. Job instruction finalized and complexity established*
   - *7.3. Simulation or floor experience for "hands on" repetition with leaders, coordinators, and operators*
   - *7.4. "Hands on" repetitions during Manufacturing Validation Builds on all shifts/crews*
   - *7.5. Operator Readiness is tracked on flexibility charts*
8. *Engineering information verified*
   - *8.1. Part release*
   - *8.2. Master Process Documents*
   - *8.3. Program Dimensional Plan*
   - *8.4. Weld documentation (Process Data Sheets, templates, Weld Pattern and weld appearance requirements)*
9. *Customs requirements identified for shipping equipment and materials across international borders*
10. *Parts Ordering Process*
11. *Metal Center content = PPI/EMS; Outside Suppliers (non-metal center content) = GSC/MGO*
12. *Product Quality standard issues identified and resolved*
13. *Customs requirements identified for shipping equipment and materials across international borders*
14. *Verification stations, CARE, IRC, Global Customer Audits, Monitoring, Water Booth, Squeak and Rattle, Simulator, and Squeak and Rattle*
15. *Evaluation track tryout*
16. *Facilities Layouts*
17. *Container Validation*
18. *SPO Material Process*
19. *T – event process*

Reference:

1. *GM Integrated Manufacturing Process (IMP)*
2. *GMNA Paint*
3. *Manufacturing Quality Plan*
4. *Problem Documentation Worksheets*
5. *GMNA Material Flow Reference Manual*
6. *Global Manufacturing System*

Complete Operation Readiness and Certification (GMS Workstation Readiness)

Description: Process description same as D1.

Timing: Starts: (24) weeks before SORP – Ends: (8) weeks after SORP

Check List:

1. *Operation certification completed*
2. Operator training ongoing
3. Special fixtures qualified
4. Work area visually defined
5. Area layout complete
6. *Workplace layout complete*
7. *Master Process Plans available and visible*
8. Manifest available
9. Part usage list available
10. Job instruction in place
11. *Standard feature checks verified - cell and operation SOS*
12. Repair procedures in place
13. *Error-proofing (visual controls)*
14. *Problem Documentation Worksheets*
15. Workplace ergonomics checked
16. *Housekeeping procedure ready*
17. *Tools in place*
18. *Material presentation devices ready*
19. *Lock-out procedure in place*
20. Safety procedures in place
21. Process equipment preventative maintenance plan in place
22. *Process equipment qualification completed*
23. *Printers located and functioning*
24. Hand-held scanners and bar-code readers in place and functioning
25. *Systems ready, and UAT complete and approved*

Reference:

1. *Global Manufacturing System: 14.1 Operation Readiness*

Complete Maintenance Readiness and Certification

Description: Process description same as D1.

Timing: Starts: (30) weeks before SORP – Ends: @ EOA

Check List:

1. Operation certification completed
2. Operation Readiness Checklist
3. Technical Acceptance Equipment
4. *Maintenance Readiness & Certification*
   - *4.1. Standardization*
     - *4.1.1. Preventive Maintenance instructions available and placed in plant local tracking system (MAXIMO, etc.); TPM-Boards available and on location*
     - *4.1.2. Hard- and Software documentation, including mechanical and electrical drawings available and placed on location.*
   - *4.2. Built-In Quality*
     - *4.2.1. Pre-acceptance by maintenance is complete and OK*
     - *4.2.2. End-acceptance by maintenance is complete and OK*
   - *4.3. People Involvement*
     - *4.3.1. Safety instructions and lock-out layouts available and placed*

4.3.2. Required maintenance training is complete or planned
4.4. Short Lead Time
4.4.1. Spare parts list available
4.4.2. Are required spare parts available?
4.5. Continuous Improvement
4.5.1. Lessons learned tracking in place

Reference:

1. Global Manufacturing System: 14.1 Operation Readiness

D6. CKD Parts Quality Management

Execution Responsibility: Program Quality Manager - Source Plant, *Quality Representative* – Receiver Plant

Description: The Program Quality Manager (PQM) is responsible for the Development and execution of the CKD Parts Quality Management Plan, which defines events, activities and resources required to assess the ability of the product and process to meet quality requirements. This Plan, which includes parts buy-off plans, launch training plans, issue resolution plan and key enablers is integrated into the GLP vehicle build plans to ensure all launch resources are focused on completion of the deliverables within the plan. The CKD Parts Quality Management Plan is managed at the condition of CKD parts before each assembly process by the SQE Quality Manager with the support of the BIW Quality Lead and is continually refined until the start of the MVBNS event.

Timing: Starts: (36) weeks before SORP – Ends: (24) weeks before SORP

Check List:

1. Parts Glide path status
2. Parts quality status
3. Launch problem solving history
4. Metal Readiness

Reference:

1. Global Purchasing & Supply Chain

D7. Launch Operations Center

Execution Responsibility: *Plant* Launch Mgr

Description: The objective of the Launch Operations Center is to provide a common area in the assembly plant location for Production Launch Team activities and communications during the launch. It is important to have the Launch Operations Center set up to accommodate people (engineers, suppliers, management) who will be visiting the plant to support the launch. It enhances safety, communications, and teamwork as well as the work efficiency of the visitors. The physical Launch Operations Center can be located within the assembly plant, in temporary offices, or in modified trailers at the assembly plant site.

Timing: Ends: (33) weeks before SORP – *Ends: LTR*

Check List:

1. Assure Launch Operations Center is ready

1.1. Plant Launch Team travel plan
  1.1.1. Schedule
  1.1.2. Budget
  1.1.3. Travel and housing arrangements for team members
1.2. Location and size
1.3. Desks, phones, FAX machines, copy machines, CAD, UG tubes, plotter, and Ethernet card access
1.4. Computer interface to corporate systems and engineering databases
1.5. File cabinets and office supplies
1.6. Office supply purchase procedure
1.7. Plant layout posted
1.8. Emergency procedures posted
1.9. Launch team organization, members' list and phone and pager numbers listed
1.10. Plant support contacts and phone and pager numbers available
1.11. Sign-in board for the team and visitors
1.12. Vehicle Build schedule posted
1.13. Safety procedures
1.14. Plant Mutilation/ Protection Requirements posted
1.15. Build Status Wall
1.16. Material handling procedures
1.17. Launch team meetings
  1.17.1. Schedule (IRT, PIT, Daily Wrap-Ups, etc.)
  1.17.2. Meeting rooms
  1.17.3. Agenda

2. Travel Arrangements
  2.1. Airline/ GMAT travel budget and plans
  2.2. Automobile rental, company vehicle availability
  2.3. Housing/Apartments/Hotel accommodations
  2.4. Contact with American Express Corporate Services (travel)
3. Daily status reports
4. Problem communication, resolution and documentation procedures
5. Local area maps, restaurants and other facilities information available
6. Immigration and Customs procedures available
7. Supplier Risk Assessment chart

D8. After-sales Plan

Execution Responsibility: *Brand Quality Manager*

Description: **I**t is necessary to add Aftersales Department in the launch of a new product in order to create plans and actions related with after sales activities. The Service and Parts Organization (SPO) Service Engineer (SE) will develop and communicate the Assembly plant service parts plan (with volumes required) to the BIW and PPI Lead as required. The SE will provide necessary SPO contact information for specific concerns and act as the contact point for PPI and BIW requests.

To have an integral and complete product launch towards the end customer including and monitoring the development of all the aftersales steps needed to support the market (i.e. spare parts availability, technical training, service tools, accessories development, basket of parts, etc).

Timing: Vehicle To Dealer date + *2 weeks*

Duration: 60 to 90 days depending on the magnitude of the program and the acceleration rate (One week of advanced training / familiarization is typical prior to Ship To Commerce.)

Check List:

1. Service parts identified
2. All service part on contract
3. Spare parts availability
4. Technical training
5. Service tools
6. Accessories development

D9. Perform Line Balance

Execution Responsibility: *Plant Launch Manager/Area Launch Managers / Industrial Engineering*

Description: *The initial operation documentation defined in the IE labor system (APS, SWAT, etc.) will be provided to the receiver plant from the source plant. The plant teams in conjunction with the launch teams will review the operation information by group, develop additional required detail, eliminate waste from the operation, and improve the efficiency of the operations. Operation improvements learned during each in plant build event will be made prior to the beginning of the Saleable Manufacturing Validation Build.*

Timing: *Starts: (36) weeks before SORP - Ends: (10) weeks before SORP*

Check List:

1. *Operation sequence completed*
2. *Open issues identified and listed*
3. *Master Process Plans Available*
4. *Man/Machine Charts (Body Shop)*
5. *Baseline Process Flow Diagram (Body Shop)*
6. *Operation Scrolls (Moving Line Stations)*
7. *Supply Chain Part Planning (SCPP)*
8. *Tooling List*
9. *Workcell layout (Zone or S.L.) completed*
10. *Ergonomic Evaluation sheet completed*
11. *Production Problems identified and resolved*

Reference: *1. Global Manufacturing System website (see address in **Appendix C**)*

D10. Confirm Process Monitoring – In-Plant Builds

Execution Responsibility: Receiver Plant Quality Launch Manager

Description: The *Product Process Validation Vehicles (PPV)* and Manufacturing Validation Build vehicles must comply with assembly process specifications (torque, harness routing, welds, Global Customer Audit [GCA]) by monitoring throughout the build process. *Manufacturing Confirmation Build (strip and build) vehicles should be utilized to train auditors prior to the first Product & Process Validation Vehicle (PPV) build to ensure that auditing processes and procedures are effective and comprehensive.*

Another best practice to train team members to ensure assembly to process specifications is to use "wiring assessment" workshops that practice the harness routings. This method of training for routing components works for electrical wiring harnesses, HVAC components, and chassis brake & fuel lines. These workshops can be held off-line using an early MVBns unit or a static buck or partial BIW to demonstrate proper manipulation of components in routing and assembly. Additionally, Wiring assessments should be conducted at PPV, MVBs & EOA.

MVB vehicles that will be shipped to separate auditing organizations (Proving Grounds) should be built as early as possible within each build bucket. These vehicles should be shipped by truck from the plant as soon as possible. To enable expedited shipping, these vehicles are not required to go through Batch and Hold or launch drive audits, but must meet all appropriate Global Customer Audit (GCA) and CARE standards.

Timing: Starts: (*23*) weeks before SORP – Ends: End of Acceleration

Check List:

1. Vehicle evaluation per specification utilizing Product Quality Standards for:
   - 1.1. Assembly sequence and conformance to technical specification requirements met for key operations
   - 1.2. Torque
   - 1.3. Harness routing
   - 1.4. Welds
2. Train auditors
3. Obtain documentation of audit specifications
4. Vehicle evaluation per specification utilizing Product Quality Standards
   - 4.1. Assembly sequence and conformance to specification requirements met for key operations, torques, harness routings, and welds
5. Train auditors
6. Obtain documentation of audit specifications
7. *VIN stamp verification*
8. *Label location*

Reference:

1. Product Quality Standards

D11. Assess Supplier Launch Readiness

Execution Responsibility: Program Purchasing Manager/Supplier Quality Launch Manager

Description: The supplier launch readiness process will begin a risk assessment for high risk or late to timing suppliers that focuses on the manufacturing facility, production part/process status, and quality to ensure the presence of total capability to support a production launch. These assessments should include the process control plans with a completed process failure mode effects analysis, program timing, material flow, packaging, quality requirements, and proposed communication network. There should be a total program risk analysis completed and the launch support personnel need to be identified. This is NOT the first time that the supplier capability has been assessed.

Critical suppliers identified on the Red Launch Alert list will continue to be monitored throughout the Launch window.

Timing: (52) weeks before SORP – Ends: (24) weeks before SORP

Check List:

1. Overall program timing
   1.1. Pending engineering changes scheduled for implementation
2. Manufacturing system layout
3. Process Flow Diagram
4. *Process Control Plan*
5. *Process Failure Mode and Effects Analysis Completed*
6. Part quality targets planned and agreed upon
7. Assembly fixture concept complete/agreed part checking scheme
8. Material packaging plan complete
9. Program Risk Analysis
10. PPAP activities planned
11. Communication/launch support personnel identified

Reference:

1. GPSC Early Warning Risk Assessment
2. Advanced Product Quality Planning and Control Plan

D12. Report Status at Manufacturing Readiness Reviews

Execution Responsibility: *Plant* Launch Manager (PLM)

Description: The Manufacturing Readiness Review (MRR) meeting is an executive review of each program's manufacturing readiness. There is a common report format that is followed with Five-Phase Problem Resolution documents required for red items. Once PPV begins, the data is compiled on a weekly basis by the PLM and then analyzed for performance. The standard report format is the Weekly Launch Report, which is generated using the on-line web application. It is the responsibility of the MCE/PLM to present the data weekly at the MRR meeting. However, it is suggested that elements of the Weekly Launch Report are presented by their corresponding functional group representatives. The Program Quality Manager will present Warranty, J.D. Power and GCA Glide Path updates. The Supplier Quality Assurance Manager (SQA) will report on PPAP status and the Launch Alerts. *It is the responsibility of the Plant Launch Manager to ensure that status of specific activities is provided by the appropriate owners at the intended time.*

For any element with a RED status, a five phase action plan will be required.

Timing: ***Monthly/Bimonthly Program Review***
Weekly Launch Review
Programs with PPV's **-** *Starts: 2 weeks prior to PPVs Ends: EOA*
Programs without PPV's - Starts: 2 weeks prior to MVBns Ends: EOA

Check List:

1. *Utilize web-based Weekly Launch Report tool*
2. *Update program specific required information each week (Some data will have to be downloaded from other web-sites: URLs are on MVB template)*
3. *Program Readiness Review Scorecard*

4. *Flawless Launch Guideline Scorecard*

Reference:

1. *MRR on MPM website (see address in **Appendix C**)*

D13. Complete Global Launch Process Assessment

Execution Responsibility: *Plant* Launch Manager, Global Launch Process Advisor

Description: The Global Launch Process (GLP) Assessments are performed*, as required for regional "critical launches"*, to assure effective execution of the Global Launch Process through identification and remediation of discrepancies to the standard process. The assessments keep the Global Launch Process Team continually engaged with the Plant Launch Teams and provide opportunities to mentor the Launch Team.

If an assessment is required, it is performed during the second bucket of the Manufacturing Validation Build non-saleable build. The Launch Process Manager/Advisor will initiate pre-visit communications with the PLM/MCE, explaining the purpose and timing of each of the assessments following the listed activities below:

GLP Implementation Assessment Process

1. *The GLP Advisor coordinates schedules with PLM prior to visit to plan the assessments (MVB-NS)*
2. *The GLP Advisor assesses the Launch for adherence to the Global Launch Process and looks for potential new best practices*
3. *A wrap-up meeting is held with the MCE/PLM to discuss observations, share recommendations and summarize future action plans*
4. *The advisor issues an assessment letter with observation points of excellence and improvement findings and publishes it to the MCE/PLM*
5. *The PLM responds to GLP Advisor with proposed countermeasures for process deviations identified in the assessment letter*
6. *The Manager of GLP Execution group approves the countermeasures for process compliance*
   - *For Major Issues escalate to GLP Leadership (if needed)*
   - *For Major Issues escalate to MPM's Director (if needed)*
7. *The MPM/PLM implements countermeasures to improve launch effectiveness*
8. *The GLP Staff review countermeasures at the MPM staff meeting for "lessons learned" and continuous improvement*

Assessment of typical activities includes:

1. *Launch Core Team Meeting*
2. *Daily Wrap-up Meeting*
3. *PIT and IRT Meetings*
4. *Launch CAB*
5. *Observe PPV/MVB Build (Operator Readiness, Equipment Installation, Material Readiness, Packaging/Routing, etc.)*
6. *PQRR events*
7. *Quality Audits*
8. *Program Status*
9. *Change Management Process*
10. *Launch Training Plan*
11. *Capture Best of the Best (B.O.B) and Lessons Learned*

Benefits of the GLP Assessment include:

1. *Assist the program team with status evaluation*
2. *Drives the use of Common Process such as:*
   - *2.1. Issue Resolution Process*
   - *2.2. Launch Team Meetings*
   - *2.3. Launch CAB Change Management Process*
3. *Accelerates the application of new best practices to launches*
4. *Provides continuous program engagement of the GLP Launch Advisors*
5. *Enables the continuous improvement of the GLP Owner's Manual*

Timing: MVB-NS- Starts: (16) weeks before SORP – Ends: SORP

Check List:

1. Develop schedule of events for the assessment
2. Documentation required:
   - 2.1. Manufacturing Validation Plan
   - 2.2. Launch Targets
   - 2.3. Launch Training Plan
   - 2.4. Build by Objective Sheets
   - 2.5. Quality Launch Plan
   - 2.6. EWO's /Temp. EWO's
3. Wrap-up Meeting
4. Develop Countermeasures

Reference:

1. GLP Advisors Guide

E. In-Plant Build Activities

E1. *Execute* Manufacturing Confirmation Builds

Execution Responsibility: *Plant* Launch Manager

Description: Manufacturing Confirmation Builds are primarily used for training operators in the assembly plant. This activity is generally the first assembly plant build event and is retained at the assembly plant to be used for various operator training activities. *These units are the Integration vehicles that are used by the assembly plant to be torn down and rebuilt on or offline, and to various levels of completeness depending on the plant infrastructure and training plan.*

*NOTE: The recommended minimum of MCB vehicles is (2) based upon lessons learned. If an alternative plan is recommended from the typical (IVER) build procurement process, this agreement must be in writing, and the execution responsibility of the Manufacturing Chief Engineer for the program**. It is unacceptable to not provide units to the assembly plant/plants for use as training vehicles**.*

These units should be sent to the assembly plant as completely built units minus fluids. It is best to utilize the intended assembly process as the baseline when building these units. Generally, these vehicles are not intended to be started or driven at any time. Software and fluid fill processes should not be followed in order to simplify the strip and build process followed at the plant. Software releases and DVT readiness are timed for availability at the beginning of the Product/Process Validation Vehicle (PPV) event.

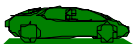
When there are multiple plants in a launch cadence, the team should evaluate if their MCB units can be produced by the other plants that are in the PPV/MVB phase. This will allow the later launches to use MCB's that have the latest engineering changes.

Timing: Starts: (*46*) weeks before SORP – Ends: (*40*) weeks before SORP

-

Check List:

1. *Verify that MCB units are included in the Pre-Production Budget. (Note: Any arrangements that would vary from the process would be documented during the GLP workshop with execution responsibility being assigned to the Manufacturing Chief Engineer.)*
2. *Parts are ordered through Pre-Production Operations.*
3. *Utilize MCBs for strip and build process between build events*
   - *3.1. Additional manpower required to support strip and build*
   - *3.2. M-schedule relief should be considered for online strip and build process*
4. *Plan to order spare parts to support operator training activity*
   - *4.1. Identify person that will input orders*
   - *4.2. Verify spare parts cost is in the Manufacturing Expense Budget*
5. *Impact/coordination with third party assemblers*



Reference:

1. *Material shipping procedure*
2. *AIAG Production Part Approval Process (PPAP)*

E2. KD EPL/SPL Verification Builds

Execution Responsibility: Launch Manager – CKD Receiver Plant /
Project Coordinator – CKD Source Plant

Description: Knock Down Engineering/Supplier Part List Verification Builds are primarily used for verifying information of the vehicle production intent. *The Source Plant will supply a top coat painted BIW to the Receiver Plant.* This activity is generally the first CKD Receiver Assembly Plant build event and is retained at the assembly plant to be used for various Product and Manufacturing Engineering activities. These units are to be built off line, (in a validation center) and to the intended production assembly process. Additional benefits of this build are to compliment the CKD Receiver Plants' training plan, and updating the Standard Operation Sheets (SOS). The units remain at the CKD Receiver Assembly Plant as completely built units. Product Engineering may request these vehicles for Emission, Certificate or Safety type approvals, durability test, or confirmation of vehicle specification. *If the Receiver Plant country has regional specifications, the parts list must be modified to reflect this regional production intent.* A final potential benefit can be the opportunity for the CKD Receiver Plant to confirm the matching of their specific localized parts.

Timing: Starts: (28) weeks before SORP - Ends: (26) weeks before SORP

Check List:

1. 100% CKD purchased parts from the Source Plant
2. B.I.W. is supplied as *topcoat painted* by Source Plant
3. Spare parts are ordered to support operator training activity
4. Standard Operation Sheets (SOS)
5. *Develop meeting schedules and facilitate meetings*
   5.1. In-Plant Build Daily Wrap-up Meeting (see Appendix Q)
   5.2. Launch Team meeting (see Appendix Q)

Reference:

1. Material shipping procedures

E3. Conduct Product/Process Validation Vehicle Build

Execution Responsibility: *Plant* Launch Manager/Product Engineering Manager

Description: The Product/Process Vehicle event is used to produce vehicles for completion of Vehicle Technical Specifications (VTS) and validation/verification/final calibration in areas where production tooled parts & production assembly process are required. PPV begins the early validation of the production process plus training of the assembly plant personnel. The event is not to be used for vehicle development purposes or VTS validation that can be completed on Integration Vehicles. These units will either replace engineering use of MVB-NS or Integration Vehicles dependent upon when the engineering work was scheduled.

The PPV event is targeted to be run on line at the Assembly Plant with the Launch Team owning the event. The customers of the PPV units will order the properties using the MGO ordering system and procedures. All parts are to be early shots off of production tools. It is important that the

Assembly Plant material department have a plan to quarantine, store, kit and stage the material in conjunction with the PPV build schedule. There is one MRD for Body and one for GA in support of this event.

The quantity of PPV units must be included in the vehicle build plan and will depend on program complexity *and manufacturing capability. If additional vehicles are needed to meet global requirements, these needs must be considered and discussed at the vehicle timing workshop.*

The cadence of build is aligned with the validation testing requirements and the *Validation Test Complete (VTC)* date, which is timed one week prior to the Manufacturing Validation Non-Saleable start. *In GMNA, the completed PPV units will need to be at their specified Testing destination before 8:00 am on Monday of the designated arrival week. This will compress the build, audit, test, and repair timing in the Assembly Plant. One unit from the first, third, and fourth PPV build buckets will be assigned to the Quality Assessment Program for evaluation.*

Timing: Starts: (*25*) weeks before SORP – Ends: (*17*) weeks before SORP

Check List:

1. Parts are ordered through the production ordering system.
2. Spare parts are ordered to support operator training activity
3. Appropriate assembly tools and systems installed (not all)

Objectives:

1. *Safety*
2. *Throughput*
3. *Controls, Conveyors, Robotics & Welding (CCRW)*
4. *Dimensional*
5. *Surface*
6. *Welding (Ready to perform 6-Event Welding System Qualification)*
7. *Torque*
8. *Sealing*
9. *Option Verification*

Reference:

1. Product/Process Validation Vehicle Guide
2. AIAG Production Part Approval Process (PPAP)
3. WS-4A (see Appendix C)
4. MV-1 (see Appendix C)

E4. Monitor Launch Change Management Process

Execution Responsibility: *Manufacturing Integration Manager / Plant Launch Manager / Program Engineering Manager*

Description: *The purpose of the Launch Change Management Process is to manage change both from a product and process perspective. This allows the assembly center time to train their workforce, to validate their manufacturing systems and to resolve any product / process concerns that arise during Manufacturing Validation Build events. The Product and Process Red Zones have been established as the periods of time when the Launch Team manages product / process changes. Before a program reaches this point in time, all processes to manage changes need to be defined and operationalized.*

Timing: *Product - Starts: (30) weeks before SORP – Ends: End of Acceleration*

Process - Starts: (6) weeks before SORP -- Ends: End of Acceleration

Check List:

1. *Product Engineering and Assembly Process Change Management Procedure established*
   - *1.1. Change Management Coordinator identified and trained*
   - *1.2. Purchasing Launch Coordinator identified and trained*
   - *1.3. Launch Team trained in the Launch CAB process*
   - *1.4. Launch Team trained in the Launch TWO process*
   - *1.5. Launch Team trained in ETO process*
   - *1.6. Launch Team trained in PTR process*
   - *1.7. Launch CAB start communicated*
   - *1.8. Launch CAB schedule communicated*
   - *1.9. Change tracking database in place*
   - *1.10. Change criteria documented*
   - *1.11. 19 Point Launch CAB Procedure understood*
2. *Vehicle design validation plan timing / manufacturing validation build schedule consistent*
3. *Multiple change inputs controlled*
   - *3.1. Launch Build Issues*
   - *3.2. Cost Reduction*
   - *3.3. JD Power*
4. *Develop meeting schedules (see Appendix Q)*

Reference:

1. *19 Point Launch CAB Production Work Order Procedure*
2. *Launch CAB training information on Global Launch Process - Execution website*
3. *CAB / EIT information on Quality as a Value website (see address in Appendix C)*
4. *PTR / ETO information on GMNA Quality website (see address in Appendix C)*
5. *NOA #PLB 017 Red Zone Guideline*
6. *NOA #GPLB-313 Global Temporary Work Order (TWO) Process*

E5. Execute VSSM Vehicle Launch Plan

Execution Responsibility: *Divisional Product Manager*

Description: *The third and fourth phases (Development, Execution) of the Vehicle Sales/Service and Marketing Vehicle launch plan must be fully integrated with the manufacturing build plan. Close cooperation is necessary to balance the need for vehicles to support this plan and balance the needs of other users of PPV/MVB vehicles. Changes to the SORP and acceleration plans may have an impact on the advertising roll-out.*

Timing: *Starts: (52) weeks before SORP*

Check List:

1. *Begin Advance Order Program*
2. *On-going Management of Marketing Vehicles*
3. *Finalize/Communicate Distribution Plan*
4. *Develop Dealer Order Guide*
5. *Go Live with Internal Launch Website*
6. *Develop Media Strategy*
7. *Deliver Non-Saleable/Saleable Pilot Vehicles*

8. *Approve Owner Manual*
9. *Deliver Product Guide*

Reference:

1. *VSSM Vehicle Launch Process Manual*
2. *GMU # 20612 Marketing Global Launch Process*
3. *GMU # 22801 Elements of Launch*

E6. Metal and Surface Audit Validation Process Surface ("Black Painted Vehicle Reviews")

Execution Responsibility: Plant Quality Director/Manager

Description: *This process will occur at the vehicle assembly plants to evaluate exposed metal surface readiness, in preparation for new vehicle launches. This process provides a communication tool to identify and document metal & surface issues that require resolution and the development of countermeasures with timing & responsibilities, to meet perceived quality expectations before start of system fill for saleable vehicles.*

Reviews occur before each major non-saleable and saleable events, at a minimum (3) reviews required from non-saleable to SORP.

Core Team members review and grade each panel on the black painted body, only use non-reworked panels.

This procedure follows the requirements and criteria set forth in the Global Surface Quality Evaluation Procedure (GSQEP), reference 1.

Reference panels must be maintained after each event at both assembly and stamping locations.

Results posted on the ME Quality Web Site (or Global/Regional Equivalent) under program name.

All items identified during the review require the appropriate organizations to follow up on the their respective stamping or body shop issues with countermeasure action plans and timing

This process will apply to exterior panel surface approval in the CKD Launch Manual between the SUP (supplying) plant and the receiver (CKD) plant.

Timing: *Non-Saleable 1 (repeat as team decides during NS builds)*
Saleable 1 (repeat as team decides during Saleable builds)
SSF/SORP

Process Check List:

1. *Surface Evaluation Standards (GSQEP).*
2. *Core Team Member Identification and Training (Contiguous / Stand Alone Metal Centers / SQ or CKD Participants).*
3. *Black Painted Vehicle Review.*
4. *Lighting Conditions.*
5. *Recording, identification and tracking of black painted vehicle reviews.*
6. *Containment and Escalation.*
7. *Reference Documents.*

**This process is currently utilized in GMNA during new program launches to obtain surface approval on the exterior sheet metal parts for PPAP surface approval.*

Reference:

1. *Global Surface Quality Evaluation Procedure*
2. *Global Surface Quality Evaluation Form*
3. *GLOBAL DRAFT Metal and Surface Validation Procedure*
4. *Quality Surface Defect Record – newly approved global process for escalation (pending global procedure approval and release)*
5. *GMNA Manufacturing Quality web site or Global/Regional Equivalent (see Appendix C)*

E7. Packing Events

Execution Responsibility: CKD Source Plant Packing Area Mgr.

Description: The CKD Source Plant will inform the CKD Receiver Plant on the packing schedule. The CKD Receiver Plant can plan to visit the source plant, if necessary. The purpose of this visit is to perform the packing buy-off process, observe how each part is being packed, support the labeling activity and verify the loading plan**.**

The receiver Plant Material Manager should participate and take any opportunity to perform some "picking & tagging" activities to support this packing event. This will provide early detection of potential packing list or part numbering issues.

The total transit time must be considered when timing this event for a program.

Timing: Starts: (*38*) weeks before SORP - Ends: (*36*) weeks before SORP

Check List:

1. Part condition
2. Packing material
3. Part orientation
4. Stuffing miscellaneous packing to save space
5. Quality control procedure
6. Picking vs. packing list verification (EPL confirmation)

E8. Perform Production Part Approval Process (PPAP)

Execution Responsibility: *SQA Launch Manager (APQP team to support)*

Description: *PPAP has undergone significant revisions effective GVDP. The former Master Status of Approved, Interim A-E, and Rejected has been replaced by:*

- *Approved*
- *Saleable*
- *Non-Saleable*
- *Rejected*

PPAP Status is known for all parts prior to or at the Material Required Dates that support the Manufacturing Validation Builds (PPV, MVBns & MVBs). All parts and assemblies that are not "Approved" shall be accompanied with documentation showing, in detail, the driver codes that

prevent approval. This will be accomplished through the use of the PPAP Worksheet (GM 1411). The PPAP Worksheet will provide customers with detail on what the issues are and the corrective actions underway. The PPAP Worksheets (GM 1411) will be provided by the APQP organization and reported during the program PQRR meetings by the Supplier Quality Launch Manager.

Timing: ***Calendar Year 2008 Targets***
MVS1 Full PPAP: 75% (Saleable PPAP: 100%)
SORP Full PPAP: 85%
EOA Full PPAP: 100%

Reference:

1. GP-4 Pre-production/pilot material shipping procedure
2. *AIAG Global APQP Procedure/Production Part Approval Process (PPAP) Manual*
3. *PPAP Training Presentation*
4. *Supplier Manufacturing Validation Process to ensure manufacturing capability early*

E9. Assess Supplier Run-at-Rate/Build-at-Rate

Execution Responsibility: *SQA Launch Manager (APQP team to support)*

Description: *Run-at-Rate / Build-at-Rate activity is conducted to verify that a supplier's actual manufacturing/sequencing process, while operating under normal operating conditions, is capable of producing per PPAP quality process controls and at the correct contracted capacity level. Run-at-Rate verification runs will be conducted in a suppliers home production process and includes all customer requirements associated with a given production process. The duration of the Run-at-Rate event will be sufficient to verify that the process can meet the contracted capacity while producing the Total Customer Requirement. The default length of the Run at Rate will be equal to the daily contracted hours. Should Run-at-Rate results fail to meet the requirements of GP-9 for quality and/or capacity a corrective action plan must be submitted and approved by GM.*

Examination of the supplier base should not exclude "Internal" GM Suppliers (e.g. metal stamping or interior molding).

Timing: *Week -23 100%Scheduled*
Week -8 100% Conducted
SSF: 90% Pass

Reference:

1. *GP-9 Run at Rate General Procedure*
2. *Global Advanced Product Quality Planning (GAPQP) Manual*

E10. Un-Packing Events

Execution Responsibility: CKD Source Plant Packing Engineering Mgr.

Description: Activity takes place at the CKD Receiver Assembly Plant. Tasks include; training the customer plant operators, verify the integrity of the material, validate the boxes and how to open the packs. In case of returnable packs, review how to send back to source plant.

If the "picking & tagging" was not completed at the SUP packing event, then it must be done here, to identify packing list and part numbering issues.

Timing: Starts: (*22*) weeks before SORP *(BIW MVBNS1 MRD)*

Check List:

1. Part integrity
2. Pack Conditions (damage, rust, water leaks)
3. Verify the load diagram meets the customer needs
4. Verify labeling meets the customer needs (if applicable)
5. *Opportunity for "picking & tagging"*

E11. Complete Manufacturing Validation Builds

Execution Responsibility: *Plant* Launch Manager

Description: Manufacturing Validation Builds are the vehicles built on-line in the assembly plant prior to the start of production. This approach differs from traditional GM practice in that a significantly larger number of vehicles will be built on line. The MV Build approach is based on best practices of GM's competitors and has been validated by recent launches in all regions within GM's global manufacturing organizations.
The motivation for building a large number of on-line vehicles is twofold. First, this provides an earlier and more structured approach for the program to identify and correct problems that are related primarily to process. By pulling this activity forward in the program, there is more time to resolve and integrate solutions as opposed to struggling with the problems after Start of Regular Production. This will result in better performance to the Quality Glide Path. The second motivation for this approach is to pull forward organizational and operator learning on how to build the new product.

Successful execution of this activity will significantly reduce Duration of Acceleration, a key business metric that is part of the program contract.

Objectives:

1. Controlled rigorous system to introduce latest level parts and materials into the vehicle as quickly as possible
2. Iterative problem-solving to minimize the number of build issues at SORP
3. Skill up the production organization/line operators

The bucket build process is GM's best current practice to fulfill the above three objectives. The Manufacturing Validation Build (MVB) Template shows details of how this activity should be executed. Also see "MVB Bucket Build Guidelines" (Best Practice examples) for details on MVB execution at various product change levels. Within each build bucket the indicated number of vehicles should be built at line rate. The line operators should build the vehicle. The time intervals between the buckets should be used to develop and implement solutions to outstanding problems. The organization should focus on achieving saleability as early as possible. Every effort should be made to provide the latest engineering change level at the highest part quality to ensure vehicle saleability as soon as possible.

There are a total of 6 Material Required Dates (MRD) for the build buckets. Each MRD is 10 calendar days before the build and is defined as an Assembly Plant event. Any deviation to this requirement will be directed

by the assembly plant Material Department (e.g., Metal Center parts, sequenced parts, bulk parts, etc.). This is necessary to break point materials between builds so that corrective actions (product & process) can be validated prior to SORP.

Not all problems can be resolved and implemented in the two weeks between consecutive buckets. Therefore, it is important that the program implement a good scheduling system for managing problem resolutions and scheduling the solutions into downstream buckets for validation. If retrofits are required to achieve saleability of these vehicles it is important that the program have a good tracking system for knowing what post-build retrofits need to happen to each vehicle by VIN.

The Manufacturing Validation Build (MVB) activity is triggered by the availability of make and buy parts for Manufacturing Validation Builds (sub-system sheet metal parts meet vehicle level requirements). These parts will be used to build the non-saleable vehicles in the Manufacturing Validation Build schedule. Sufficient quantities of this metal must be planned for early in the program. *Minimum non-saleable PPAP status is required for PPV and MVBns.*

In the course of the build activity for the Non-Saleable portion of the Manufacturing Validation Builds the following level of detail needs to be recognized:

- This is the second Production System driven event
- The Launch Manager is the process owner of the build event
- Global Supply Chain (GSC) has material-procurement-responsibilities through the MGO system
- The launch team should conduct regularly scheduled reviews of build readiness and communicate to Engineering, Plant Management, and GSC.
- *Completion of Welding System Qualification Weld Destruct Events 3 & 4*
- Body Surface Panel Reviews
- GSC is the single point for material status and support at the plant during the build.

All parts and assemblies (for Non-saleable Build Buckets), that are not dimensionally correct, shall be accompanied with documentation showing in detail, the dimensional characteristics of the part/assemblies. The purpose of this requirement is to aid in root cause problem solving.

At times, the number of MVB units required to validate the process exceeds GM internal customer demands due to the MVB buckets being extended to ensure the product quality. It may become necessary to pull SORP orders (unassigned dealer orders) into the last bucket of MVB-S. The SORP Order Process is designed to provide additional test and/or evaluation vehicles with marketable content “as necessary” whenever a major content change (MCE3/Major) is encountered.

Process Verification

One measuring mechanism is the utilization of the “Scout Build Process”. This is where a property from an upcoming MVB event is selected to be built on line one day prior to the start of the bucket build. This vehicle should be designated at least two weeks prior to the start of the build and contain the greatest amount of option content in that MVB bucket. This advanced vehicle build enables the Assembly Center to exercise its entire manufacturing system (e.g.: Tools, Processes, Assembly Operations etc.)

and identify any issues or potential bottlenecks prior to the official start of the build event. This is critical to validate body to trim attachments.

The first body built that represents production intent will be held in a Body Shop offline area to allow General Assembly operators sufficient time to install and evaluate interior and exterior trim part attachment point interface problems. If Body or GA rework is required, it must be done prior to shipping the body. It may be beneficial to repeat this process with each significant vintage of required material parts. Maintenance Readiness is validated during the tryout phase. Maximo should be populated, all spares delivered and technical training finalized.

The calibration of the powertrain for Integration Vehicles is expected to be complete prior to the event. However, due to subtle differences in performance that can exist between Integration Vehicles and Manufacturing Validation Build vehicles, Powertrain must verify that the calibrations developed on Integration Vehicles are acceptable, and compliant with regulations when applied. In order for the Rapid Problem Resolution Calibration (RPR Cal) to be issued prior to the Manufacturing Validation Build –Saleable event, it is essential that PPV vehicles ordered by Powertrain be delivered to the Milford Proving Ground/GME Proving Ground as early as possible. This requires that MVB Non-Saleable vehicles ordered by Powertrain be planned at the front of the MVB Non-Saleable build plan, and that the actual delivery of these vehicles to the Milford Proving Ground be expedite through special rapid shipping provisions.

With the customer defined as the retail customer, a Customer Enhancement Calibration (CEC) is a calibration used after MVB-S, prior to SORP. A CEC consists of Priority Level 2 changes only, focused on significant product improvements and/or customer requests. These significant product improvements are defined as:

- Collective Powertrain calibration that reduces JD Power IQS by at least 1 PPH
- Program/Launch Team requested items
  - Priority Level 2 changes as defined within EDC&V:
- Significant Product Improvement or Cost Reduction, Customer Request, Support Business Plan Commitments, Resolve IPTV Issue

Guidelines for what is considered CEC versus other Calibrations:

- Confirming the parameters/intent of the final set of calibrations
- **100% cal due at MVB-NS** is intended to be final saleable cal for Emissions, Diagnostics and Drivability
- **RPR cal due at MVB-S** adjusts the 100% cal for MVB-NS variation experience
- **Customer Enhancement Cal** before SORP provides final Drivability quality refinements base on CTF experience

Every attempt should be made to have all vehicles in this activity be saleable. This greatly improves the effectiveness of discovering and resolving meaningful problems, rather than wasting time with non-compliant material. Achieving saleability also facilitates operator learning on production quality material rather than being burdened with having to unlearn and relearn. Saleability obviously requires PPAP parts.

Prior to Contract Signing, it is important to forecast how many PPV and Manufacturing Validation Builds to have in the program.

Timing: Starts: GA = (*17*) weeks before SORP

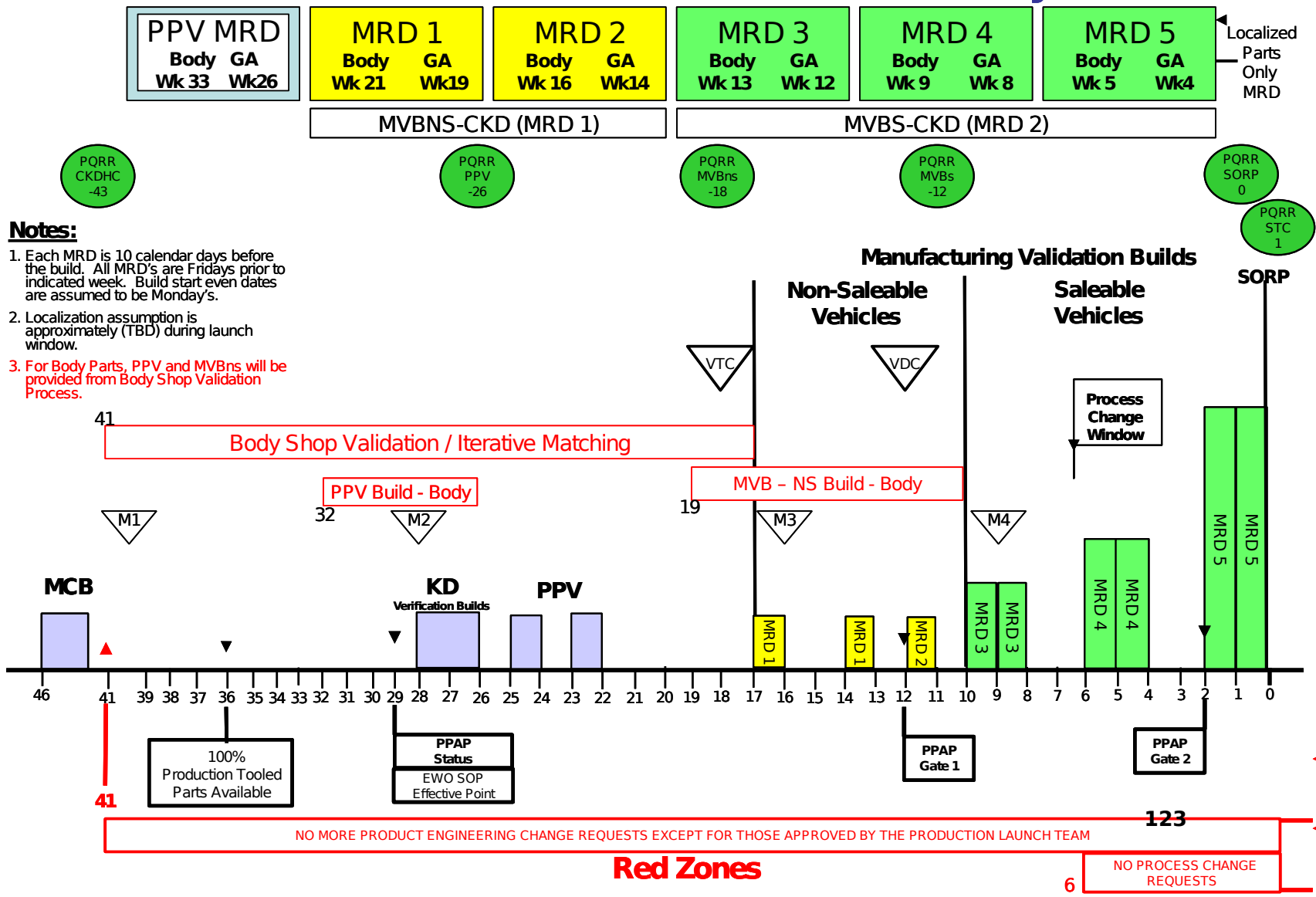
Body = (*19*) weeks before SORP-Ends: 1 week before SORP

Check List:

1. Dimensionally correct part off production tools available for Manufacturing Validation Builds.
2. Bucket builds planned and supported with the appropriate resources.
3. Order Flow Plan (Order to Delivery [OTD]) ready at week –26
4. Reconfirm (-12 weeks) and execute (-3 weeks) the Order Flow Plan
5. Objectives and intended learning established by buckets.
6. Tracking system in place to track individual vehicles by VIN
7. Facilities, tools and equipment in place to support activity
8. Issue resolution and change management in place to support activity
9. MVB activity integrated into employee “Hands on” training and enthusiasm plan (including communication of event)
10. Complete all requirements for PQRR (MVB)
11. Make sure MVB-NS and MVB-S orders have correct content.
12. Match Marketing ordering guides to build combinations/content (manual check).
13. Make sure VDS matches PPC.
14. Weld Verification plan and weld destruct vehicles identified *(Completion of Welding System Qualification Weld Destruct Events 3 & 4)*
15. *Vehicle mutilation protection available and utilized*

Rev. 05/28/08

CKD Global Manufacturing Validation Build (General Assembly)



1.3. All Aisles and Lineside Approaches allow Proper Material Flow
2. Container Validation
   2.1. Operator Friendly & Ergonomically Correct Packaging
   2.2. Container and Dunnage Handling Plan Complete
   2.3. Lot Size Minimized
3. Logistics Validation
   3.1. Delivery Routes Optimized
   3.2. Receiving Windows Scheduled
   3.3. Externally Dock Plan and Utilization is Complete
   3.4. Carrier Service Responsibilities Established
   3.5. Transportation Mode Determined
   3.6. Frequency Established
4. 3rd Party Validation
   4.1. Sequencing Processes Functional
   4.2. Communications Functional
   4.3. CMA Processes Functional
5. Dock to Operator Elements
   5.1. Internal Dock Plan & Utilization Functional
   5.2. Visual Controls Posted in Storage Areas
   5.3. Discrepant Material Procedures Validated
   5.4. Material Tracking Handoff Process Complete
6. Material Readiness Checklist
   6.1. Material Lineside Presentation
   6.2. Flow Rack Optimized
   6.3. Visual Controls Correct
   6.4. Loop Size Verified
   6.5. Mobile Equipment Requirements Verified
   6.6. Material Routings Correct
   6.7. Material Pull Signal Functional
7. SPO Material Process Verified
   7.1. SPO Racks Identified
   7.2. SPO Material Flow Validated
8. Material Readiness Checkpoint Process
   8.1. Material Checkpoint Process Completed
9. Plant Material Management
   9.1. Assembly Manifest document created with all RPO combinations comprehended.

Reference:

1.Global Manufacturing System

E14. Conduct Launch Quality Assurance Processes

Execution Responsibility: *Quality Launch Manager*

Description: *The purpose of the Launch Quality Assurance Processes is to:*

1. Deliver vehicles that meet customer expectations

2. Identify, contain, & resolve quality issues at the plant, particularly during a program's launch acceleration.

All applicable programs are required to use the following Quality Assurance Processes

Welding System Qualification Complete

Start of Regular Production (SORP) Weld Destruct Event 5 Complete. All plant resources and processes must be in place and validated.

End of Acceleration + 6 weeks (EOA + 6w) Weld Destruct Event 6 Complete. Produce vehicles at 100% of contracted "new model" daily volume.

CCRW Welding Engineer documents the results of all 6 weld destruct events on the Welding System Qualification Status Sheet prior to Transition to Assembly Center. The purpose is to assure that the launch builds meet the required quality objectives.

Launch Drive Audit

Launch Drive Audit is an activity at start of system fill (SSF) that is focused on early evaluation of new product content for MCE's and Majors. The purpose is to confirm the functionality of specific model features and assure that the launch builds meet the required quality objectives. It is important to observe that this process might not be applicable to all CKD countries, due to governmental restrictions in what concerns new vehicle traffic on public roads. However, it is the PLM and QLM's responsibility to make the efforts to conduct the process and/or identify alternative plans to perform necessary verifications focusing on customer protection.

The audit consists of static, dynamic and night checks to confirm that the vehicle features documented on the Launch Audit drive check sheet, meet the quality standards. The sample size requirements are as follows:

Majors: The first 300 – 500 vehicles produced after SSF are 100% audited and then a daily sample is checked until a minimum sample of 1000 vehicles from the home plant have been reviewed through EOA. Requirements for non-home plants are regionally defined.

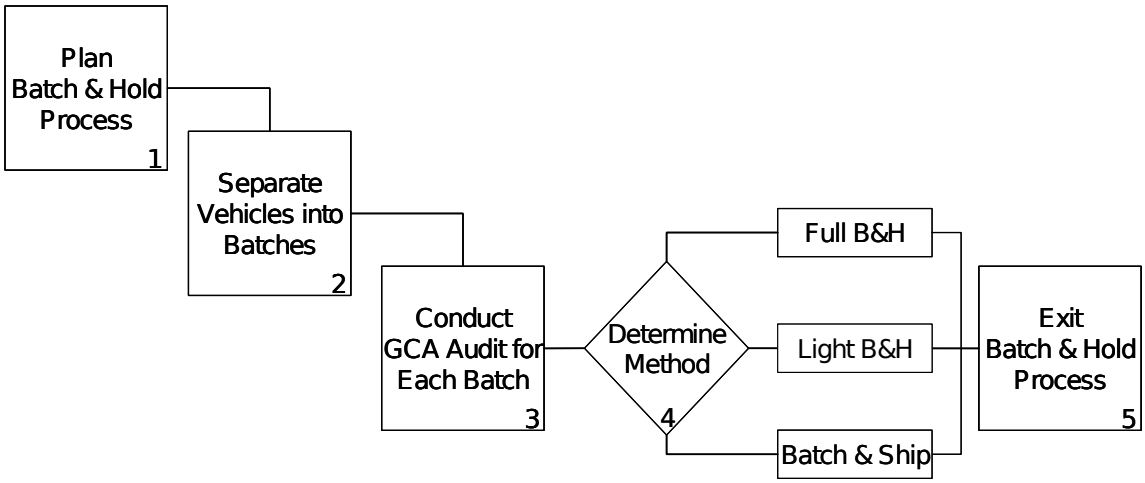
MCE-3s: 50 vehicles per day for the first week following SSF. For the three weeks following the initial SSF week a sample of 30 vehicles per day is reviewed until total sample of 700 vehicles have been audited from the home plant. Requirements for non-home plants are regionally defined.

MCE-2s/Powertrain: PLM and Plant Quality Manager determine whether a launch drive audit is necessary. Recommended sample is 200 vehicles.

CKD: 100% of vehicles produced per day for the first week following SSF. Reducing the sample per the glidepath to achieve 0% sample by Launch Team Release (LTR). Assumes no major quality issues are identified.

Batch & Hold

The Batch and Hold process consists of 5 major steps:



The process is applicable to all new programs and begins with MVBs. The launch team and Plant Management must plan in advance to ensure the plant is capable of performing the Batch & Hold process without impacting other plant deliverables.

Check List:

1. *Execution strategy plan developed*
2. *Resources identified and roles established*
3. *Auditing and repair personnel trained*
4. *Repair confirmation strategy*
5. *Facilities planning & safety review*
6. *Issue communication plans developed*
7. *Corrective action plans in place*
8. *Retrofit plans*

Reference:

1. *Launch Drive Audit Check Sheets*
2. *Batch & Hold, GMNA Quality website. (Address listed in **Appendix C**)*
3. *Shipping of Quality Assessment Vehicles, RASIC for Shipping of Quality Assessment Vehicles (**Appendix M**)*

APPENDICES

Appendices are included in this section to provide manual readers additional reference materials to clarify Manual topics or demonstrate concepts with additional graphics.

APPENDIX A: Acronyms and Abbreviations

ACM	*Aggregated Contribution Margin*
AIAG	Auto Industry Action Group
ALBS	Assembly Line Balance System
AP	Advanced Purchasing
APPM	Assistant Program Planning Manager
APQP	Advanced Product Quality Planning
AR	Appropriation Request
ASM	Assembly Plant
ASQ&R	Advanced Supplier Quality and Readiness
ATS	Aero/Thermal/Sealing Integration Center
AVCE	Assistant Vehicle Chief Engineer
AVLE	Assistant Vehicle Line Executive
AVG	*Assembly Verification Group*
BEC	Base Engineering Content
BIC	Best-In-Class
BIW	Body in White
BIWDA	*Body In White Data Analyzer*
BLT	*Body Leak Test*
BOM	Bill of Material
BOP	Bill of Process
BR	Beta Release
B/S	Body Shop
C4	CAD, CAM, CAE, CIM
CAB	Change Approval Board
CAD	Computer Aided Drafting
CARE	Customer Acceptance Review Evaluation
CAR	Corrective Action Report
CAS	Concept Alternative Selection
CCRW	Controls, Conveyors, Robotics & Welding
CDIS	Common Dimensional Information System
CEC	Customer Enhancement Calibration
CI	Concept Initiation
CKD	Complete Knock Down
CKDI	*Complete Knock Down Initiation*
CMA	Central Material Area
CMC	Change Management Coordinator
CML	Change Management Leader
CMM	Coordinate Measuring Machine
CPIP	Continuous Product Improvement Process
CPIT	Current Production Improvement Team
CR	Change Request
CRB	Change Review Board
CS	Contract Signing
CSO	Contract Sign Off
CSPC	*Common Stable Part Code*
CTF	Captured Test Fleet
CTIS	Common Training Information System
CVER	Concept Vehicle Engineering Release

CVIS	Completed Vehicle Inspection Standards
CVMS	Company Vehicle Management System
CVS	Completed Vehicle Standards
CY	Calendar Year
DCIP	*Dimensional Control Inspection Plan*
DE	Design Engineer
DFA	Design for Assembly
DFFA	Dimensional Fit, Function and Appearance
DFM	Design for Manufacturability
DM	Deliverables Management
DMA	Data Management Administrator
DMA	Deliverables/Imperatives Management Analyst
DMF	Data Management Facility
DMS	Document Management System
DMSS	*Dimensional Management Steady State*
DOA	*Duration of Acceleration*
DPM	Dimensional Program Manager
DQ&V	Design Quality & Verification
DRE	Design Release Engineer
DRL	Direct Run Loss
DRR	Direct Run Rate
DSI	Document of Strategy Intent
DSO	Design Sign Off
DTC	Diagnostic Trouble Code
DTS	Dimensional Technical Specifications
DVT	Dynamic Vehicle Test
DWHI	Die Welder Hemmer Integration
E²	E Squared Work Order Process
EBM	Experimental Build Manager
ECD	Estimated Completion Date
EDC&V	*Engine Development Calibration Validation*
EDR	Event Data Recorder
EDM	*Engineering Document Management*
EFF	Environmental Fitting Fixture
EGM	Engineering Group Manager
EIST	Executive Integration Support Team
EIT	Engineering Implementation Team
ELOT	*End of Line Test*
EMS	*Engineering Material System*
EOA	End of Acceleration
EPL	*Engineering Parts List*
EPN	Engineering Program Number
EPN	Engineering Project Number
EPP	Engineering Program Plan
EPS	*Electronic Pull System*
EPU	Engineering Program Update
ERSM	Engineering Requirements Status Matrix
ETAC	*Exterior Total Assembly Checking*
ETO	Engineering Try Out
EWO	Engineering Work Order
FEDR	Functional Evaluation Design Request
FIVC	First Integration Vehicle Complete
FMEA	Failure Mode and Effects Analysis
FMVBC	First Manufacturing Validation Build Complete
FMVSS	Federal Motor Vehicle Safety Standards
FNA	*Functional Name Address*
FPE	Field Performance Evaluation
FSS	*Flexible Scanning System*

GA	General Assembly
G/A	General Assembly
GAIM	General Assembly Integration Meeting
GCA	Global Customer Audit
GDIS	*Global Dimensional Interface Systems*
GD&T	Geometric Dimensioning & Tolerancing
GLC	Global Launch Council
GLP	Global Launch Process
GLPIA	Global Launch Process Implementation Assessment
GLST	Global Launch Support Team
GM	General Motors
GME	GM Europe
GMME	General Motors Manufacturing Engineering
GMNA	General Motors North America
GMS	Global Manufacturing System
GMU	General Motors University
GMVO	General Motors Vehicle Operations
GPDS	Global Project Delivery System
GPSC	Global Purchasing and Supply Chain Organization
GSC	*Global Supply Chain*
GSCP	Global Supply Chain Planning
GVDP	Global Vehicle Development Process
H2H	*Hole to Hole*
HC	*Health Check*
HR	Human Resources
HRM	Human Resource Manager
HSS	High Strength Steel
HVAC	Heating, Ventilation, Air-conditioning
IAR	Interior Assessment Review
IDR	Initial Data Release
IE	Industrial Engineering
IM	Integration Manager
IMP	Integrated Manufacturing Process
IPTV	Incidents Per Thousand Vehicles
IQS	Initial Quality Survey
ITAC	*Interior Total Assembly Checking*
IR	Issue Resolution
IRC	Independent Repair Confirmation
IRT	Issue Resolution Team
ISD	Instructional Systems Design
ISO	International Organization of Standardization
ISP	Integrated Scheduling Project
ITP	Integrated Training Plan
ITPIT	Integrated Training Plan Implementation Team
ITS	Implementation Tracking System
IV	Integration Vehicle (Quality Valve)
IVER	Integration Vehicle Engineering Release
IWR	*Impromptu Web Reports*
JES	Job Element Sheets
JPH	Jobs per Hour
KCC	Key Control Characteristics
KCDS	Key Characteristic Designation System
KPC	Key Product Characteristics
LAAM	Latin America, Africa, Middle East
LLPR	Long Lead “P” Release
LMS	Learning Management System
LOC	Logistics Optimization Center
LPI	Launch Process Initiation

LPO	*Limited Personalization Options*
LPP	Local Process Plan
LTM	Launch Training Manager
LTP	Launch Training Plan
LTR	Launch Team Release
LTTM	Launch Technical Training Manager
MAT'L	Material
MAXIMO	GMNA common plant Preventative Maintenance (System)
MCB	Manufacturing Confirmation Build
MCE	Mid Cycle Enhancement
MCE	Manufacturing Chief Engineer
MCE3	Mid Cycle Enhancement Level 3
MFG	Manufacturing
MGAE	Manufacturing General Assembly Engineer
MGO	Material Global Optimization
MIM	Manufacturing Integration Manager
MIT	Manufacturing Integration Team
MLM	Material Launch Manager
MLT	*Manufacturing Leadership Team*
MPCF	Manufacturing Process Changes Frozen
MPD	Master Process Documents
MPL	*Master Parts List*
MPM	Manufacturing Program Management
MPS	Manufacturing Planning Studies
MR	Manufacturing Requirements
MRD	Material Required Date
MRD	Manufacturing Requirements Database
MRR	Manufacturing Readiness Review
MSD	Manufacturing Strategy Document
MSDS	Material Safety Data Sheets
MSE	Manufacturing Systems Engineer
MSE	*Measurement Systems Engineer*
MSIE	Manufacturing Systems Integration Engineer
MSU	*Model Start-Up*
MTBF	Mean Time Before Failure
MTTR	Mean Time To Repair
MVB	Manufacturing Validation Build
MVNS/MVBNS	Manufacturing Validation Non-Saleable
MVR	*Market Validation Review*
MVS/MVBS	Manufacturing Validation Saleable
NOA	*Notice of Action*
NSMVB	Non-Saleable Manufacturing Validation Builds
NV	Noise Vibration
OEM	Original Equipment Manufacturer
OSC	*Operator Support Center*
OT	Overtime
OTD	On-Time Delivery
OTJ	*On The Job*
OTS	Off Tool Sample
PA	Production Achievement
PAA	*Production Action Authorization*
PC	Problem Communication
PCDMIS	*Personal Computer Dimensional Measuring Interface Standard*
PCP	Process Control Plan
PDQ	Product Development Quality
PDT	Product Development Team
PEM	Program Engineering Manager
PEP	Product Evaluation Program

PET	Program Execution Team
PFEP	*Plan For Every Part*
PI	Performance Integration
PIA	Parts in Assembly
PIM	*Program Investment Manager*
PIT	Plant Issue Team
PLA	Production Launch Algorithm
PLB	*Process Leadership Board*
PLC	Purchasing Launch Coordinator
PLM	Plant Launch Manager
PLP	Principle Location Points/Product Line Profitability
PM	*Preventative Maintenance*
PM&C	*Production Monitoring and Control*
PMM	Program Manufacturing Manager
PMR	Program Manufacturing Requirements
PMRE	Program Manufacturing Requirements Engineer
PNOC	*Parts Not On Contract*
PO	Purchase Order
POMS	Production Order Management System
PPAP	Production Part Approval Process
PPC	Product Program Content
PPCR	Program Plan Change Request
PPH	Problems per Hundred
PPI	Product and Process Integration
PPLM’s	Pre-Production Launch Managers
PPM	Program Purchasing Manager
PPO	Pre-Production Operations
PPPM	Pre-Production Program Manager
PPS	Practical Problem Solving
PPV	Product & Process Validation
PQEP	Program Quality Escalation Process
PQM	Program Quality Manager
PQRR	Program Quality Readiness Review (formerly Quality Valve)
PQS	*Program Quality Standards*
PR	Performance Review/Purchase Request
PRR	*Problem Reporting and Resolution*
PRT	Part Type Work Order in CAB process
PRTS+	Problem Resolution Tracking System
PSR	Program Status Review
PST	Plant Support Team
PT	Powertrain
PTES	Production, Tool & Equipment Schedule
PT&E	Process, Tooling, and Equipment
PTR	Production Trial Run
PVB	Process *Verification* Build
PWO	Production Work Order
QA	Quality Assessment
QAD	Quotable Actionable Document
QAP	Quality Assessment Process
QAS	Quality Assessment Sheet
QBC	Quality Build Concern
QC	Quality Characteristic
QL	Quality Lead
QLM	Quality Launch Manager
QRD	Quality, Reliability & Durability
QS	Quality System
RASIC	Responsible, Approve, Support, Inform, Consult
R@R	*Run At Rate*

RPO	*Regular Production Option*
RPR	Rapid Problem Resolution [Powertrain Calibration]
RYG	Red, Yellow, Green
SAE	*Society of Automotive Engineers*
SAS	Statistical Analysis System
SB	Strategy Board
SCPP	Supply Chain Part Planning
SE	*Service Engineer*
SF	Styling Freeze
SKD	Semi Knock Down
SME	Subject Matter Expert
SMT	System Management Team
SMVB	Saleable Manufacturing Validation Builds
SOA	Start of Acceleration
SOB	Start of Build
SOJT	Structured On-The-Job Training
SOT	*Start of Test*
SOP	Start of Production
SORP	Start of Regular Production
SOS	Standardized Operation Sheets
SOW	Statement of Work
SPA	Shipping Priority Audit
SPL	*Supplier Parts List*
SPO	Service *and* Parts Organization
SPQRC	Safety, People, Quality, Responsiveness, Cost
SQA	Supplier Quality Assurance
SQE	Supplier Quality Engineer
SQLM	Supplier Quality Launch Manager
SSF	Start of System Fill
STC	Ship to Commerce
SUP	*Single Unit Product*
SVER	Structure Vehicle Engineering Release
T3	Train - The - Trainer
TAC	Total Assembly Checking
TAC	Technical Assistance Center
TCE	Total Customer Enthusiasm
TID	Target Implementation Date
TIP	*Throughput Improvement Process*
TIR	Test Incident Report
TMSC	*Team Member Support Center*
TPAS	*Training Plan Administration System*
TPM	Total Predictive Maintenance
TTI	*Technical Training Integrators*
TWO	Temporary Work Orders
UAT	*User Acceptance Test*
UG	Uni-graphics
UPC	*Uniform Part Classification*
VAE	Vehicle Assembly Engineer
VAM	Vehicle Architectural Manager
VAPIR	Vehicle and Performance Integration Review
VCE	Vehicle Chief Engineer
VDC	Validation Documentation Complete
VDP	Vehicle Development Process
VDQM	Vehicle Dimensional Quality Manager
VDR	Verified Data Release
VDS	Vehicle Description Summary
VIN	Vehicle Identification Number
VLE	Vehicle Line Executive

VLD	Vehicle Line Director
VLT	Vehicle Line Team
VOC	Voice of Customer
VPI	Vehicle Program Initiation
VPR	Vehicle Line Product Review
VSSM	Vehicle Sales, Service & Marketing
VTC	Validation Test Complete
VTD	*Vehicle to Dealer*
VTS	Vehicle Technical Specification
WIP	*Work In Process*
WFG	Worldwide Facilities Group
WO	Work Order
ZMA	Zero Mileage Audit

APPENDIX B: Roles and Responsibilities

Administrative Assistant
Roles and Responsibilities

Roles

- Serves as an assistant to the Plant Launch Manager

Responsibilities

- Coordinates travel scheduling for resources coming in and out of the plant
- Coordinates local housing requirements for Launch Team members on temporary assignment during launch
- Ensures all visitors to plant get required safety training
- Keeps Safety Training log book
- Coordinates CTF pool vehicle driving
- Coordinates Manufacturing Reviews
- Creates agendas for meetings
- Continuously captures and inputs lessons learned into the database
- Creates metrics for build events
- Maintains Launch Team Org Chart, Extended Launch Team Org Chart and all Contact Lists
- Maintains timekeeping - submits to HQ MPM for input to GMTKS
- Prepares various charts, reports and data for meetings
- Program Wall Reviews at Plant
- MRR Packet
    - Attends MRR meetings
    - Gathers new data and creates new MRR packet
    - ELS Report
    - Meeting Notes
- Maintains MVB Launch Plan & Waterfall Chart
- Performs clerical duties for the Launch Team
    - Orders and maintains miscellaneous supplies for launch team
    - Handles all IT Requests including computer hardware, software, cell phones, passwords, badges, etc
    - Coordinates in plant office area and facilities for launch team (desks, phones, layout, supplies, signage, etc)
    - Schedules conf rooms, conference calls, meetings as needed
    - Maintains Launch Team Vacation Chart
    - Maintains Launch Team weekly schedule (who is where when)
    - Takes IRT launch team meeting minutes/ minutes at other meetings
    - Maintains Launch Website and posts updated materials and links
    - Assists in pulling presentations together
    - Completes special assignments, as required

BIW ME Execution Lead
Roles and Responsibilities

Roles

- Provides manufacturing continuity from Vehicle Program Initiation (VPI –8 weeks) to End of Acceleration (EOA)
- Accountable for integration of internal and external deliverables supporting program milestone dates.
- Acts as single voice to the Program Manufacturing Manager and Vehicle Line Executive.
- Provides BIW leadership and support to the Body Shop launch structure as a member of the core launch team and attends all launch team meetings.
- Indirect report to the Plant Launch Manager.
- Liaison to the Body Shop Area Manager for BIW Manufacturing Engineering issues.
- UAT Champion

Responsibilities

Financial

- Creates the Body Shop detailed Level 3 cost estimates for Contract Signing.
- Accountable for overall Body Shop program dollars and responsible for tracking by GM TOPPS line item. Manage movement of Body Shop dollars between Engineering Group Managers (EGM).
- Coordinates BIW response to required business cases, Manufacturing Planning Studies (MPS), etc.

Program & Deliverables Timing

- Develops level 2 Tool & Equipment Schedule for equipment build & installation plans and tracks overall project Integrated Schedule.
- Responsible for all construction and installation activities in the Body Shop.
- Responsible for completion of tool & equipment installation, de-bug and validation during the following phases.
  - Body Shop Tooling & Equipment Validation *and Common Buy-Off*
  - Manufacturing Validation Build, Non-Saleable
  - Manufacturing Validation Build, Saleable
  - Acceleration
- Represents BIW at Program Quality Valves.
- Communicates Body Shop program investment and launch status to BIW Management, Program Team and Program Launch Team. Represents BIW at program meeting.
- Provides Level 1 & 2 outline for all Master Dot activities for BIW responsibilities, ensuring updates with the appropriate countermeasures.

Process Validation

- Develops a Body Shop manufacturing validation plan that supports the acceleration schedules and comprehends the plant build restrictions.
- Responsible for all activities to ensure successful MVB events.
- Responsible for dimensional tune-in and quality plan (BIW Quality Lead)
  - Vision Systems
  - CMM Programs
  - Checking Fixtures
  - Hem Pass Events
  - Enabler 31
  - ABC Percent on Target
  - CDIS
- Responsible for validation of workstation layout, ergonomics and error proofing.
- Coordinates the implementation of Body Shop support systems.
  - C-More
  - PM&C
  - DTR

Product Interface & Issue Resolution Process

- Ensures that the Manufacturing Requirements (MR) are clearly communicated to the product engineering community facilitating Process Driven Product Designs.
- Coordinates with PPI the level of parts for each build and any part re-work
- Responsible for daily issues meeting, owner assigned and root cause established.
- Coordinates through the BIW Quality Lead any issues that have been root caused, even those found to be in General Assembly or Paint.
- Participate and support the Issue Resolution Process (PIT/IRT) as stated in the Global Launch Process Manual.
- Implement the TIP Process at 15jph to begin working on throughput issues.

Deliverables

- The BIW Program Lead is responsible for flawless execution of program deliverables.
  - Ergonomics and Safety
  - Quality
  - Throughput
  - Investment Performance
  - Timing Performance
  - Material Flow
  - Labor – HPV
  - Equipment Maintainability
  - Service Part Plan
- Body Shop workable layout.
- Tools and equipment validation.

Body Quality Lead
Roles & Responsibilities

Roles

- Assigned to program at Integration Vehicle Build (IVB), reporting to the BIW Execution EGM. Plays key support role to VDQM.
- Responsible for vehicle dimensional quality related to the BIW
- Possesses strong leadership & communication skills and a strong background in dimensional engineering, tooling & manufacturing processes, and leading problem solving teams.
- When a VDQM is not assigned, the BIW QL will fill this role.

Responsibilities

- Supporting the Vehicle Dimensional Quality Manager as needed
- Root causing and resolving BIW dimensional issues from Matching until plant transition. The Dimensional Validation Engineers, LDM, DPM, Zone ME's , etc. all support the BIW QL in this effort.
- Developing/maintaining the 'Program Dimensional Quality Report' and posting it to the BIW execution website. This includes updating the ABC Metric reports
- Assisting with the development/execution of the iterative matching/body shop validation plan. And, on request of the VDQM, lead the Iterative match process at the suppliers – MFD.
- Supporting the VDQM in working with Stamping and other suppliers to correct quality issues affecting the build
- Supporting the VDQM on reporting out on the dimensional quality/status of the vehicle from IVB thru launch, which includes the following metrics: BIW E-31, A, B, C & Finished vehicle (FVS)
- Conducting weekly zone/area focused dimensional performance meetings with appropriate BIW zone ME's, LDM, plant personnel, etc. to review dimensional metrics (E-31, ABC, FVS, GCA, SPA, Fit Gate) and providing prioritized top issues. BIW QL assigns issue owners and drives issue resolution to improve dimensional quality.
- Daily Dimensional meetings to coordinate tool tune in activities and engineering resources as required.
- Ensuring tooling 101/drill panel activities are scheduled and completed at Assembly Plant if not performed prior to buy-off.
- Creation of the data wall (E31 wall) and ensures integration into plant processes (maintained by data mgr).
- The implementation of the common shim log/tool change process with assembly plant resources. Once implemented, all shim requests are to be approved by the BIW QL before implementing.
- Prioritizing, communicating, and driving issue resolution for the issues identified from the M3 & M4 builds
- Supporting the VDQM in ensuring the dimensional exit criteria is complete, including gap closure plans, prior to Launch Team Release.
- Supporting the VDQM in the DTS gate reviews (@ PQRR MVS-Finished Vehicle Ship Targets, EOA-DTS Reconciliation) to determine acceptable ship targets
- Document issues in the 5-phase and post on the web.

Supports

- The Matching process
- The IRT process; attends IRT meetings as appropriate
- The measurement point selection / buyoff process & the definition, upgrade and delivery of measurement systems to the Assembly Plant to meet vehicle objectives
- The DPM & team in the resolution of the top dimensional quality issues prior to Matching
- The Production Tooling design reviews and buyoff; drives corrections to Production Tooling based on PPO Integration build dimensional findings (datum coordination / tooling 101 / variation issues)

- The DPM & LDM in developing the Dimensional Validation Plan requirements for detailed measurement plan for each build event (DCIP)
- Support the TAC Fixture design reviews.

Body Shop Coordinator
Roles and Responsibilities

NOTE: The Body Shop Launch Manager will assign one of the Body Shop Coordinators the Roles and Responsibilities outlined below. (GMNA Only)

Roles

- *Reports to the Body Shop Launch Manager*
- *Assigned to program at the beginning of Body Shop Iterative Match Build at GVDP week -60. Completes checklist items per required completion dates.*
- *The Body Shop Coordinator has a strong background in:*
  - *Assembly plant dimensional control systems and tooling and plant problem solving and reporting tools (7-Diamond, Production Routing & Tracking System (PRTS), Blue card)*
  - *Dimensional Engineering, including Geometric Dimensioning and Tolerancing (GD&T) requirements, measurement systems, data analysis, variation analysis, and problem resolution.*
  - *Manufacturing Operations*
  - *Tooling and Manufacturing Processes, both Body Shop and General Assembly*
  - *Leading Problem Solving Teams*

Responsibilities

- *Ensuring assembly plant resources are available and have adequate skill sets and training to maintain the data collection/analysis/problem solving/checking systems*
  - *Ensure assembly plant personnel is trained in modifying (delete/add) a measurement point and has resources to assist in correlating the vision data output to that of the Coordinate Measurement Machine (CMM) data output.*
  - *Confirm assembly plant has identified plant personnel to be trained to operate and maintain the vision systems during the launch and Start of Regular Production (SORP) phases*
  - *Ensure Body Shop has a Dimensional Process that follows elements as described in Dimensional Management Steady State Playbook Standard (DMSS). Vehicle Dimensional Quality Manager (VDQM), Body-In-White Quality Lead (BIW QL), LDC support the plant in implementing Dimensional Management Steady State standard (DMSS) elements during Launch to aid successful Steady State handoff.*
- *Executing the dimensional check schedule/detailed measurement plan for each phase (Build Check Plan/Dimensional Control Inspection Plan (DCIP))*
- *Identification and allocation of plant resources, that collect, analyze and problem-solve dimensional issues (Checking, Skilled Trades, Faro, Romer, CMM, Vision, etc.) working with the VDQM, BIW QL, etc..*
  - *Ensure assembly plant has trained resources available to assist in the setup of the vision systems, data collection/analysis/problem solving of the vision systems' concerns*
- *Scheduling work for CMM room (this includes integrating new model checks into current model check activities). This activity supports direction given by the VDQM and BIW QL.*
- *Developing Dimensional transition plan from VDQM, BIW QL to Plant for steady state (Dimensional Exit Criteria)*
- *Support use of the Interior and Exterior Total Assembly Checking fixtures (ITAC & ETAC) to root cause issues, as required*
- *Support the plant data wall. Help identify process enablers to support continuous improvement objectives and variation reduction activities. Develop plan and identify resources for maintaining data wall during steady state*
- *Support the integration of the assembly plant data collection/reporting process into the Common Dimensional Information System (CDIS)*
  - *Participate in tool certification process at Install to identify compatibility of certification data to plant equipment and software to ensure compliance at steady state- This becomes an issue when the equipment and software used by the plant is not compatible with WTC cert data and the cert data form install contractor. (Flexible Scanning System (FSS) is a good example of this item).*

- *Work with check fixture engineer to identify installation and storage requirements for TAC fixture and components and other check fixtures*
- *Assist Measurement Systems Engineers in scheduling time on the CMM for repeatability studies and in obtaining the sub-assemblies to be checked*

Supports

- *VDQM, BIW QL & Matching Team in identifying, root causing, and resolving dimensional issues; be actively engaged in meetings/discussions concerning resolution of top dimensional issues*
- *The Iterative Matching Process*

Checklist

All Checklist items are done at (54) weeks to SORP

1. *Identify training for support resources in the fundamentals*
   - *Faro – Contact Faro*
   - *Vision – Reg Broner*
   - *PCDMIS (Personal Computer Dimensional Measuring Interface Standard) - Janet Gironda or Dave Walkowski*
   - *BIWDA (Body In White Data Analyzer) – Steve Weberman*
   - *CDIS & GDIS (Common and Global Dimensional Interface Systems) – Chris Ogle/Lori Holtslag*
   - *ETAC & ITAC – Tim Cooper*
   - *White Light Scanning – Gary Telling*
   - *Tooling 101 and Drill Panel – Mitch Washer*
   - *Iterative Matching – Marie Kardasis*
   - *Hole to Hole (H2H) – Art Kendzierski*
   - *TC1(Tool Construction Standard), MV1 (Manufacturing Validation Standard), DMSS and PED114 Checking Fixture/Gage Standards– John Winter, Mitch Washer (MV1, DMSS), and Ed LaPerre*
2. *Obtain DCIP/Build and Check/Match Plan to coordinate*
   - *schedules around CMM time; Include fixture*
   - *repeatability studies; Know Iterative Match*
   - *schedule/ # of shifts required, etc*
3. *Work with Measurement Systems Engineer (MSE) and DQ&V (Design Quality & Verification) to identify locations for ETAC/ITAC storage (dupes, etc)*
4. *Readiness around plant wall*
   - *Template – Mitch Washer*
5. *Understand compatibility of certification data to plant equip/software*

Body Shop Launch Manager
Roles and Responsibilities

Roles

- Direct report to the Plant Launch Manager.
- Liaison to the Body Shop Area Manager for the Launch Team issues.
- Leads the Body Shop launch activities with support from the Plant Planner, departmental Business Manager and other plant personnel.
- Utilizes Plant knowledge, relationships and authority to "get things done."
- Engaged in Program from Verified Data Release (VDR) to Launch Team Release (LTR).

Responsibilities

Product Interface & Issue Resolution Process

- Utilizing Production Knowledge analyzes major design, tooling and specification for SPQRC issues, pulling on additional support as required.
- Actively engaged with the Engineering counterpart to ensure the Process Engineering requirements are met and executed for the Body shop.
- Coordinates the interaction between General Assembly, Paint for resolution of Body Shop issues whose root cause is found to have originated within those departments.
- Integral member of the problem resolution teams in Body Shop, ensuring that the problem solving process is being utilized.
- Executes the change management process for internal process control (tooling, material, etc.); Coordinates with General Assembly and Paint.
  - Works with the Change Management Coordinator, to develop plans for Production Trial Runs, Engineering Tryouts, Engineering Work Orders, etc. during the launch process.
  - Works with the Change Management Coordinator to understand all Temporary Engineering Work Orders, reworks and part substitutions for their impact and timing.
- Provides Leadership during the Daily issues meeting with Manufacturing and Engineering.
  - Root Cause established
  - Owner assigned
  - Containment is in place
- Conducts daily Issues Resolution Team/Superintendent meetings to resolve build issues and achieve schedule.
- Coordinates rework or replacement of non-salable parts on salable vehicles with support from other plant departments and Product Engineering.
- Coordinates the Process Verification Review, ensuring the operations are reviewed for safety, ergonomics, containers, tooling, etc.
- Attend and support Design and Process plus System Layout Reviews.

Program & Deliverables Timing

- Provides Level 1 & 2 outline for all Body Shop Master Dot activities ensuring updates with the appropriate countermeasures.
- Communicates Body Shop's status to the Plant Launch Manager and the Body Shop Area Manager.
- Works with the Material Launch Manager to help coordinate and validate the material plan for the Body Shop.
- Coordinates quality plans with Quality Systems.
- Holds team accountable to achieve manpower targets.

Process Validation

- Ensures that the Body Shop manufacturing validation plan supports the acceleration schedules and comprehends the plant build restrictions.
- Coordinates builds with the Body Shop, emphasis on Safety, Quality and Thru-put.
- Participates in the development and execution of the Body Shop dimensional tune-in plan and Matching activities.

- Ensures that Body Shop ergonomic reviews are occurring and corrective actions are developed.
- Manages the review and buy-off of Body Shop responsible items on the vehicles before shipping to the next department.
- Utilize established verification process to validate workstation layout, ergonomics, error proofing, and operator certification by start of manufacturing validation build (ref. Manufacturing Process Validation-Workstation Readiness).

Education & Training

- Identifies and develops the Body Shop Operator training and workshop plan, and ensures its execution.
- Ensures that skilled trades training is developed and being executed.
- Implements lessons learned from previous programs and captures lessons learned during the program execution.
- Ensure active participation during the Process Verification Builds.

Administration

- Provides leadership to the Body Shop launch structure.
- Coordinates daily activity of launch personnel.
- Manage all activities between PIT/IRT, facilities, equipment and budget.
- Establishes plant participation for Validation Center builds and tool shops, for system buyoffs.
- Establishes roles and responsibilities for the Body Shop Launch Team.
- Selects and supervises the Plant Body Shop team for Pre-Production build events.
- Exhibit active participation as a member of the Launch Team and attends all Launch Team meetings.
- Responsible to forecast and coordinate the necessary plant resources required during the launch (E.G. skilled trades, checkers, and production operators).
- Input into pre-production budget requirements: resources, materials, training aids, etc.

Deliverables

- The Body Shop Launch Manager is responsible for the flawless execution of the program deliverables within the Body Shop.
- Identify and resolve issues to ensure a successful launch.
- Trained Body Shop organization.
- Share Lessons Learned.

Change Management Coordinator
Roles and Responsibilities

Roles

- Direct Report to the Change Management Coordinator Supervisor from the Program Management Process Integration Group.
- Secondary Report to the *Manufacturing Integration Manager (MIM).*
- Liaison to the Plant Planning Administrator (or Assistant) as needed.
- Leads the Manufacturing Team in coordination of the change management process during the Launch Process.

Responsibilities

- Understands and daily tracks all engineering work orders issued during the Red Zone.
- Supports the issue resolution process interface with the Issue Resolution Teams (IRTs) to ensure timing and accurate engineering work order information is complete.
    - The CMC is the PRTS+ Champion in the Implementation Phase.
- Interfaces daily with the Material Launch Manager, Supplier Quality Manager (or QC Engineering Mgr) on issues pertaining to part level changes as needed.
- Attends Launch CAB meetings to assist in determining the appropriate TID. (Note: The MIM MUST attend and be the single Manufacturing voice)
- Leads the EWO Implementation Team (EIT) during launch through continuous communication with a goal of 100% on-time TIDs.

Deliverables

- Interfaces with the GSC organization to ensure timing requirements are met as issued during the approval process by the core launch center process.
- Establishes and maintains a log of all Permanent and Temporary Work Orders (PRT, TWO) changes during the launch process. Develops the tracking process for the team.
- Provides detailed information to the Issue Resolution Teams.
- Communicates engineering work order breakpoints during the “Red Zone” to the Launch Team.
- Tracks engineering work orders to breakpoints during the “Red Zone” and re-introduce engineering work orders that don’t meet the TID to Launch CAB.
- Provide Management reports as required.

Change Management Leader
Roles and Responsibilities

Roles

- Direct Report to the Engineering Design Change Management Supervisor
- Supports and Participates in the Launch CAB Change Management Process

Responsibilities

- Determine if WO requires Launch CAB approval
- Schedule DRE/DE's to Launch CAB meeting to present WO's
- Review contented WO to ensure that Launch CAB checklist and requirements have been met.
- Establish and distribute Launch CAB Work Order Agenda
- Participate in Launch CAB meeting to record outcome of the EDIT WO on behalf of the Launch Team
- Utilize Meet-Me line/Net Meeting
- Handle process issues working with Specs and Financial Cost Estimating as necessary
- CML will support Change Management Coordinator as necessary:
- Follow rejected WO's
- Reschedule WO's back into Launch CAB
- CML will support Launch EIT as necessary to resolve WO issues in HOLD, EDIT, or PROC

Dimensional Performance Engineer
Roles & Responsibilities

Roles

- Supporting the Vehicle Dimensional Quality Manager and Body Quality Lead , as needed

Responsibilities

- Take ownership of performance metrics and leads solutions
- Perform Matching Event, Tooling 101, & Drill Panel Studies in Production Tools
- Schedule Matching events in respective areas with other functional groups (DWHI, Execution, CCRW, Production…)
- Identify and document all issues in respective areas.
- Take ownership of issues and lead problem solving activities.
- Communicate and resolve tooling issues with execution counterparts.
- Communicate part quality issues to PPI engineers, Supplier Quality and MFD Launch Coordinator.
- Take daily direction from the BIW Quality Lead
- Perform White Light Scanning
- Maintain VRA Log
- Take digital pictures of issues
- Ensuring the dimensional exit criteria is complete, including gap closure plans, prior to Launch Team Release
- Conducting weekly zone/area focused dimensional performance meetings with appropriate BIW zone ME’s, LDM, plant personnel, etc. to review dimensional metrics and provide prioritized top issues.
- Daily Dimensional meetings to coordinate tool tune in activities and engineering resources as required.
- Ensuring tooling 101/drill panel activities are scheduled and completed at Assembly Plant if not performed prior to buy-off.
- Creation of the data wall and ensures integration into plant processes (maintained by data mgr).
- The implementation of the common shim log/tool change process with assembly plant resources. Once implemented, all shim requests are to be approved by the BIW QL before implementing.

Supports

- The measurement point selection / buyoff process & the definition, upgrade and delivery of measurement systems to the Assembly Plant to meet vehicle objectives
- The DPM & team in the resolution of the top dimensional quality issues prior to Matching
- The Production Tooling design reviews and buyoff; drives corrections to Production Tooling based on PPO Integration build dimensional findings (datum coordination / tooling 101 / variation issues)
- The DPM & LDM in developing the Dimensional Validation Plan requirements for detailed measurement plan for each build event (DCIP)
- Supports the IRT process
- Supports the PIT process
- The Daily Launch coordination meetings

Dimensional Program Manager
Roles & Responsibilities

Roles

- Single point contact for vehicle dimensional quality from program initiation until Integration Vehicle Build (IVB).
- Assigned to program at VPI – 12 weeks
- Possesses high level of analytical ability & interpersonal skills to work effectively with others, motivating employees. Strong leadership & communication skills and a high level of cross-functional knowledge in die/stamping, body, dimensional, & product engineering. Able to interface across several organizations to solve complex cross-functional vehicle integration issues.

Responsibilities

- Prioritizing and driving resolution of top Dimensional Quality Issues from Program Initiation to IVB event, and communicating the status/action plans related to the top dimensional issues.
- Leading the readiness, execution and tracking of Dimensional Engineering deliverables from Program initiation to EOA including but not limited to:
  - Defining, communicating and updating dimensional requirements
  - Running analytical studies to assess ability of product/process alternatives in meeting dimensional requirements
- Initiating the launch dimensional test plan and integrating with vehicle performance tests (wind noise, water leaks, closing efforts, sealing)
- Lead readiness activities – DCIP, critical parts, critical tests, objectives (IVB & Matching) – and transition to VDQM
- Leading the execution and resolution of DTS Math validation
- The DTS Gate Reviews (meetings with ME) at DSO, P2

Supports

- The Vehicle Dimensional Quality Mgr & Body Quality Lead in resolving top dimensional quality issues from IVB through launch, as required
- The Launch Dimensional Manager in the execution of the M3 and M4 plant events
- The IRT process, as appropriate
- The VDQM & Body QL in completing the plant exit criteria
- The VDQM & Body QL in the DTS gate reviews (@ PQRR MVB-S, EOA) to determine acceptable ship targets (GCA/SPA vs. DTS reconciliation, SPA exception report)
- Readiness activities – DCIP, critical parts, critical tests, launch objectives
- The Body QL in the documentation/communication of lessons learned from launch

Electrical Launch Coordinator
Roles and Responsibilities

Roles

- Direct Report to the Manufacturing Chief Engineer.
- Secondary Report to the Plant Launch Manager (PLM).
- Provides leadership and support to:
  - Launch Leadership
  - Engineering
  - Plant Electrical Coordinators
  - DVT Coordinators
  - Assembly Verification Group
  - IRT Co-Chairs
  - Raytheon

Responsibilities

- Assures that issues pertaining to testing, programming, and final line processing from an electrical prospective are resolved.
- Attends all build events (IVER through Acceleration) assisting in resolution to electrical issues.
- Attends Electrical PDT's and SMT's as needed.
- Member of the Core Electrical Launch Team & Electrical IRT
- Works with the Electrical Coordinator to ensure that Plants are using the RPM system to record repairs made during the EOL (End of Line) process.
- Assists Raytheon in developing a training plan for the EOL repairmen.
- Coordinates procurement of vehicles, bucks, subassemblies, parts and displays for training purposes.
- Assists in training the EOL Repairmen on the vehicles new electrical content.
- Assists with repairing vehicles and processing through EOL operation.
- Assists in the build and repairs throughout the plant during build events.

Deliverables

- Gives timely detailed feedback to responsible resources and groups to insure that issues are captured and the resolution process is initiated.
- Assists Service in acquiring vehicles in the early program phase so that they may develop their software and procedures sooner.
- Ensures that Service has useable Tech2 software by MVBns1 that is capable of reading DTC and clearing codes.
- Assists in getting Service to populate the WIP (Work in Progress) portion of the Si2000 web site by MVBns1.
- Assists the plant in acquiring necessary equipment (computers, printers, Tech2's etc.) and assuring it is in place for the EOL repairmen to utilize prior to the build events.

IE/GMS Future Program Execution Manager
Roles and Responsibilities

Roles

- Indirect report to the Plant Launch Manager.
- Engaged in program from Vehicle Program Initiation (VPI) to End of Acceleration (EOA). At approximately week -52 (GVDP 5.0 template) the IE/GMS Future Program Execution responsibilities are assumed by the IE/GMS Manager at the respective plant.
- Provides IE/GMS leadership and support to the IE/GMS launch structure as a member of the core launch team and attends all launch team meetings.

Responsibilities

Coordinate the development, tracking, and reporting of the program labor imperatives

- Work with the program team and the vehicle assembly plant(s) to establish Base Engineering Content, Hours Per Vehicle, and Gross Conversion Rate targets
- Track and report labor imperative status to target throughout the vehicle development process
- Provide labor impact to cost studies
- Work with Manufacturing Engineering to define the BEC sequence between major monuments
- Create and maintain a BEC Labor Database
- Drive BEC reduction initiatives through the vehicle development process
- Determine operator density and line length requirements

Coordinate Simulation Analysis to Evaluate Plant System Throughput

- Track and report throughput status for Body, Paint, GA, and overall plant to targeted levels.

Coordinate the Strategic Sourcing Process

- Assist in development of the Strategic Sourcing Strategy
- Coordinate Appendix L / F studies

Coordinate Program Ergonomic Analysis

- Coordinate analysis of all jobs to assure that there are no ergonomic issues.

Support the full implementation of GMS principles

- Serve as a catalyst for GMS implementation by training program and vehicle assembly plant personnel and leading by example
- Coordinate and track progress to the GMS Future Program Calibration

Facilitate Team Leader Lead Line Balance Process

- Work with Assembly Plant to get Team Leaders involved in job design at IVER and beyond
- Develop Workstation Scrolls for System Layouts and analyze operations to ensure lean set-up

Program & Deliverables Timing

- Communicates program base engineering content (BEC) and productivity status to IE/GMS Management, Program Team and Program Launch Team.
- Represents IE/GMS at program meeting.
- Represents IE/GMS at Program Quality Valves.

Process Validation

- Validate build sequence against job setups during the Vehicle Integration, MVBns, and MVB saleable builds.
- Analyze body shop man and machine interfaces to ensure throughput sufficiency

Education & Training

- Identifies and develops the IE/GMS training and workshop plan, and ensures its execution.
- Implements lessons learned from previous programs and captures lessons learned during the program execution.
- Train plant launch team representatives (core team, team leaders, pilot team, etc.) in effective standardized work setup (scrolling, ergonomics, etc.).

Administration

- Provides leadership to the IE/GMS launch structure.
- Establishes roles and responsibilities for the IE/GMS Launch Team.
- Coordinates daily activity of launch personnel.
- Exhibit active participation as a member of the Launch Team and attends all Launch Team meetings.

Deliverables

- The IE/GMS Launch Manager is responsible for the flawless execution of the program deliverables.
- Standardized work documentation for all direct labor operations.
- Effective workstation layouts in General Assembly
- Achieve labor productivity targets for all departments (body, paint, and GA)

General Assembly Engineering Integration Manager Roles and Responsibilities

Roles

- Indirect report to the Plant Launch Manager.
- Liaison to the General Assembly Area Manager for General Assembly Engineering (GAE) issues.
- Provides GAE leadership and support to the General Assembly launch structure as a member of the core launch team and attends all launch team meetings.
- Engaged in program from Vehicle Program Initiation (VPI) to End of Acceleration (EOA)

Responsibilities

Financial

- Creates the detailed cost estimates for GAE for the Appropriation Request (AR) approval cycle.
- Responsible for tracking overall General Assembly program dollars by EGM/LID by line. Manage movement of General Assembly dollars between Engineering Group Managers (EGM).
- Coordinates GAE response to required business cases, Manufacturing Planning Studies (MPS), etc.

Program & Deliverables Timing

- Communicates General Assembly program, investment and launch status to GAE Management, Program Team and Program Launch Team. Represents GAE at program meeting.
- Provides Level 1 & 2 outline for all Master Dot activities for GAE responsibilities, ensuring updates with the appropriate countermeasures.
- Develops tool & equipment installation plan for construction activities and incorporates it into the Plant Master Dot.
- Develops facility conversion and production & equipment installation plans. Responsible for completion of tool & equipment de-bug and validation. Tracks to GAE Production Tool & Equipment Schedule (PTES) and overall project Integrated Schedule.
- Represents GAE at Program Quality Valves.

Layouts & General Assembly Integration Meeting (GAIM)

- Responsible for all activities in specifying, procuring, designing & building GA tools & equipment.
- Coordinates the plant buy-off of GA tools & equipment.
- Coordinate procurement of bucks & vehicles for Manufacturing Engineering use at the tool vendors and other GAE functions.
- Develops overall General Assembly plant layouts. Coordinate plant layout reviews.

Process Validation

- Responsible for the General Assembly Tool & Equipment validation plan during the MVB events.
- Responsible for all activities to ensure a successful Process Validation Build (PVB).
- Responsible for General Assembly Vehicle Assembly Process within the “Assembly Process Visual Display” Wall and issue resolution prior to shipment to the Assembly Plant.

Product Interface & Issue Resolution Process

- Ensures that the Manufacturing Requirements (MR) are clearly communicated to the product engineering community facilitating Process Driven Product Designs.
- Support and participate in Virtual Build Events to meet pre-production manufacturing build requirements in the product design as demonstrated through the analysis phase.
- Supports the Virtual Engineering activity by “leading the discussion” for General Assembly at the IVBR Virtual Build (VIVA at week -100)
- Participate and support the Issue Resolution Process (PIT/IRT) as stated in the GLP Manual.
- Responsible for providing the Issue Resolution Team (IRT) Manufacturing Co-chairs to lead the problem resolution teams in GA, to review all build issues, and assign

responsibility to the appropriate team members for resolution (GA PLM is responsible for diamonds 1 – 4, GA Integration Manager is responsible for issues once transferred to the IRT at diamond 5, diamond 7 is a shared responsibility)

- NOTE: All build issues include Ergo, Design, Supplier Quality, Tools, etc.
-

Deliverables

- The IM is responsible for flawless execution of program deliverables.
- General Assembly workable layout.
- Tools and equipment validation *and Common Buy-Off*
- Achieve budget for the General Assembly program dollars.

General Assembly Launch Manager
Roles and Responsibilities

Roles

- Direct report to the Plant Launch Manager.
- Liaison to the General Assembly Area Manager for the Launch Team issues.
- Leads the General Assembly launch activities with support from the Plant Planner, departmental Business Manager and other plant personnel.
- Utilizes Plant knowledge, relationships and authority to "get things done."
- Engaged in Program from Verified Data Release (VDR) to Launch Team Release (LTR).
- UAT Champion

Responsibilities

Product Interface & Issue Resolution Process

- Utilizing Production Knowledge analyzes major design, tooling and specification for SPQRC issues, pulling on additional support as required.
- Actively engaged with the Engineering counterpart to ensure the Process Engineering requirements are met and executed for General Assembly.
- Coordinates the interaction between Body Shop, Paint for resolution of General Assembly issues whose root cause is found to have originated within those departments.
- Integral member of the problem resolution teams in General Assembly, ensuring that the problem solving process is being utilized.
- Executes the change management process for internal process control (tooling, material, etc.); Coordinates with body and paint.
  - Works with the Change Management Coordinator, to develop plans for Production Trial Runs, Engineering Tryouts, Engineering Work Orders, etc. during the launch process.
  - Works with the Change Management Coordinator to understand all Temporary Engineering Work Orders, reworks and part substitutions for their impact and timing.
- Provides Leadership during the Daily issues meeting with Manufacturing and Engineering.
  - Root Cause established
  - Owner assigned
  - Containment is in place
- Conducts daily Issues Resolution Team/Superintendent meetings to resolve build issues and achieve schedule.
- Coordinates rework or replacement of non-salable parts on salable vehicles with support from other plant departments and Product Engineering.
- Coordinates the Process Verification Reviews, ensuring the operations are reviewed for safety, ergonomics, containers, tooling, etc.
- Supports the Virtual Engineering activity by "leading the discussion" for General Assembly at the Pre Man-Val Virtual Build (VPVA at week -52)

Program & Deliverables Timing

- Provides Level 1 & 2 outline for all General Assembly Master Dot activities ensuring updates with the appropriate countermeasures.
- Communicates General Assembly's status to the Plant Launch Manager and the General Assembly Area Manager.
- Works with the Material Launch Manager to help coordinate and validate the material plan for General Assembly.
- Coordinates quality plans with Quality Systems.
- Holds team accountable to achieve manpower targets.

Process Validation

- Ensures that the GA manufacturing validation plan supports the acceleration schedules and comprehends the plant build restrictions.
- Coordinates builds with General Assembly, emphasis on Safety, Quality and Thru-put.
- Plays an active role in the development of the General Assembly dimensional tune-in plan.

- Ensures that General Assembly ergonomic reviews are occurring and corrective actions are developed.
- Manages the review and buy-off of General Assembly responsible items on the vehicles before shipping.
- Utilize established verification process to validate workstation layout, ergonomics, error proofing, and operator certification by start of manufacturing validation build (ref. Manufacturing Process Validation-Workstation Readiness).
- Supports General Assembly Matching build activities for build events M3 & M4 by working closely with the GAE Quality Lead in executing the matching requirements. (Is done by Home Plant Team in GME.)

Education & Training

- Identifies and develops the General Assembly training and workshop plan, and ensures its execution.
- Implements lessons learned from previous programs and captures lessons learned during the program execution.
- Ensure active participation during the Process Verification Builds (slow builds).

Administration

- Provides leadership to the General Assembly launch structure.
- Coordinates daily activity of launch personnel.
- Manage all activities between PIT/IRT, facilities, equipment and budget.
- Establishes plant participation for Validation Center builds and tool shops, for system buyoffs.
- Establishes roles and responsibilities for the General Assembly Launch Team.
- Selects and supervises the Plant General Assembly Team for Pre-Production build events.
- Exhibit active participation as a member of the Launch Team and attends all Launch Team meetings.
- Responsible to forecast and coordinate the necessary plant resources required during the launch (E.G. skilled trades, checkers, and production operators).
- Input into pre-production budget requirements: resources, materials, training aids, etc.

Deliverables

- The GA Launch Manager is responsible for the flawless execution of the program deliverables within General Assembly.
- Identify and resolve issues to ensure a successful launch.
- Trained General Assembly organization.
- Share Lessons Learned.

GLP Launch Advisor
Roles and Responsibilities

Roles

- Support Launch Teams by providing Global Launch Process Training and Guidance to ensure the successful implementation of the common GLP into all Launch activities.

Responsibilities

- Support the Global Launch Process activities from Contract signing through the End-of-Acceleration
- Subject Matter Expert for the Global Launch Process
- Work with Manufacturing Integration Manager and Plant Launch Manager to ensure the successful implementation of the GLP
- Provide Training in the Global Launch Process, PIT/IRT, and Launch CAB to enable all members to follow the current GM common processes
- Provide interface between GLP, GVDP and other integrated processes
- Support GLP and MVB Workshops with planned development expertise, maintain standard template
- Document “Launch Tips” and “Lessons Learned” on the GLP Website
- Lead the GLP implementation assessment activities

Deliverables

- Timing Workshop Participation
- MVB Complexity Model Analysis
- Electronic Program Book Documentation
- GLP Training
- GLP Pre-workshop Orientation
- Facilitate the GLP Pre-workshop
- Facilitate the GLP Workshop
- Facilitate the MVB Workshop
- PIT/IRT Training
- Launch CAB Training
- Lessons Learned Mentoring
- Conduct Launch Process Assessment
- Facilitate Capturing “Lessons Learned”
- Provide GLP Manual Updates
- Maintenance of the GLP and “Best Practices” Websites

Global Launch Support Team (GLST) Member Roles and Responsibilities

Roles

- Direct Report to Home Room
- Indirect Report to the Global Manufacturing Chief Engineer / Global Vehicle Chief Engineer
- Supports and Participates in the Issue Resolution Process

Responsibilities

- Attend IRTs (Regional / Global)
- Interface with respective Plant Issue Team (PIT) Leader
- Attend Build Wrap-Up meetings
- Communicate solutions to all plants
- Attend Architectural Launch Change Approval Board (CAB) meetings
- Escalate interbuildability issues
- Participate in Engineering Try Outs (ETO)
- Provide feedback to Vehicle Chiefs on program issues
- Provide feedback to GLST Process team on process issues

IRT Co-Chair
Roles and Responsibilities

Roles

- Facilitates IRT meetings and sets meeting schedules that are compatible with the PIT meetings.
- Sets direction for the IRT activities relative to Issue Resolution, Tracking, and decision making
- Provides focus to the Team.
- Responsible to execute diamonds 5-7.
- Assigns resources from the IRT to solve the issue.
- Tracks PRTS+ issues assigned to the Team.
- Holds resources accountable.
- Tracks closure rates of the IRT.
- Develop sufficiency plans on all identified validation and glide path / TIR issues - Drive issue resolution.
- Assume leadership responsibility for all product and process engineering issues in respective IRT.
- Verify that process and tooling used is in accordance with MPD requirements. *
- Ensure that MPD's are current and accurate. *
- Communicate KPC's and Control Plan requirements per MPD guidelines
- Identify mandatory test requirements.
- Optimize program, plant build and protect the customer. *
- Ensure that latest parts are at build events. *
- Validate PRTS+ fixes through build events.
- Communicate plant impact driven by product/process issue resolution.
- Identify ergonomic and error proofing opportunities and implement solutions. *
- Accountable to assist in the removal of roadblocks.
- Raise unresolved issues to the IRT Champion, Area Launch Manager or appropriate VSE/Engineering Group Manager/Director.

Responsibilities

- Responsible for coordination support of Engineering Try-Outs (ETO) and Plant Trial Runs (PTR) during launch*.
- Ensure all process opportunities are reviewed prior to recommending product changes.
- Complete initial root cause and propose potential solution to engineer.
- Manages the PRTS+ issues list during the launch process.
- Reports out during wrap-up sessions on the open issues.
- Institutes new PRTS+ issues into the system, as well as, rejects or approves (into Root Cause stage) PRTS+ issues being elevated from the Launch PRC stage (Diamonds 1-4).
- Deciding voice on closure of open issues.
- The Manufacturing PIT/IRT Co-Chairs for Wind/Water and Squeak/Rattle manage the PRTS+ issues list during launch.
- Attend plant launch events as primary area contacts on Core Launch Team. Wrap up meetings are not held on Friday to allow travel time for IRT members. Expedite issue resolution.
- Mediate problems among plants.
- Co- chairs must review their requested changes (for fidelity) on all Launch CAB PRT's before they are scheduled into the Launch CAB for approval
- Represents the IRT requested changes in the Launch CAB when required.

.* Excludes Vehicle Performance Co-Chairs

IS&S Launch Manager

Roles and Responsibilities

Roles

- Reports to the Plant Launch Manager
- Assigned to program at contract signing
- The LM has a strong background in:
    - Plant Floor System Integration
    - Integrate with the Global Launch Team
    - Manufacturing Operations, Material and Quality processes and systems
    - Tooling and Manufacturing Processes in Paint Shop, Body Shop and General Assembly

Responsibilities

- Responsible for managing the IT planning, deployment and closedown activities for a new product program.
- Facilitate the IT workshops with launch team members.
- Create the IT plan and manage changes to the program approved plan.
- Coordinate activities of the system deployments as the IS&S lead for the program.
- Overall accountability for achieving business objectives and benefits of IT plan
- Delivery and adherence to the IT Plan - including deliverables, timing, and budget
- Conduct project monitoring and control activities to report on the achievement of program milestones and deliverables
- Represent IT implementation team on the program steering committee meetings
- Ensure compliance of projects with program office policies and procedures
- Execute project management standards
- Provide oversight of the procurement of application HW/SW, infrastructure equipment and resources

Deliverables

Specific Launch Manual Deliverables

- IT plan Developed and Implemented

General Items

- Maintains and controls the IT plan.
- Conducts plant and program leadership reviews of the IT plan.
- Finalizes and continuously tracks implementation budget.
- Develops, submits, and tracks work orders for funding.
- Tracks and reports status on software development, delivery, and project timing.
- Conducts project funding review meeting with plant and/or program management.
- Monitors execution of IT training courses and training supplier performance.
- Measures testing completeness.
- Review schedule compliance and resource plans

Launch Training Manager & UAW-GM Joint Launch Training Coordinators Roles and Responsibilities

Training of the workforce is a crucial factor in a successful vehicle launch. Therefore, it is important that qualified personnel are assigned as the Launch Training Manager/UAW-GM Joint Launch Training Coordinators. The task responsibilities of the Launch Training Manager/UAW-GM Joint Launch Training Coordinators are identified in the "Check List" section of Launch Process element C1. The actual number of people needed to address these task responsibilities is a resource requirement defined in the approved Launch Training Plan (GLP element C1). In the end, no matter how many people are assigned to the Team, the responsibility is that of the Launch Training Manager/UAW-GM Joint Launch Training Coordinators. Below is a summary of role, responsibilities, and deliverables.

Roles

- Directs all facets of the launch training process including Launch Training core team job assignments

Responsibilities

- Provides a launch training implementation cost forecast.
- Applies and actively promotes the GM common processes, to include: Launch Training plan process, Global *Installation Hand Off Process* and the Global Launch Process.
- Direct tasks with plant training coordinators to check training plan, dates, numbers and attendees.
- Facilitates OEM training schedule with plant training coordinator.
- Provides recommendations on use of alternative training media and delivery methods.
- Identifies expectations/constraints to course delivery.
- Identifies and monitors work rule issues affecting training.
-

Deliverables

Specific Launch Manual Deliverables

- C1 Launch Training Plan (LTP) Developed and Implemented

General Items

- Maintains and controls the Launch Training Plan implementation baseline.
- Conducts plant and program leadership reviews of training plan and progress.
- Finalizes and continuously tracks implementation budget.
- Develops, submits, and tracks applications for funding and grants.
- Monitors and coordinates all courseware development with Manufacturing Engineering.
- Tracks and reports status on courseware development, course delivery, and project timing.
- Conducts project funding review meeting with plant and/or program management.
- Obtains other GM plant data on existing training courses and training supplier performance.

Planning Function

- Maintain all training timelines to program milestones.
- Maintains launch specific course catalogue.
- Tracks training registration and record keeping with plant schedulers/training coordinators.
- Provides management required training records summaries.

Instructional Systems Design (ISD) Function

- Develops and reviews training materials with responsible plant personnel.
- Evaluates quality of training through surveys, interviews and course evaluations.
- Prepares and maintains individual curriculum maps/flexibility charts.
- Maintains courseware common format and style requirements.

Coordinator Function

- Schedules and communicates delivery of all training.
- Coordinates requirements for instructors, rooms (inside and outside of plant), materials and special requirements. Ensures classrooms are arranged, instructor/trainee materials available and visual aids are in place.
- Tracks delivery of training against baseline training plan.
- Coordinates training review meetings.
- Forecasts plant launch training expenses post Contract Signing.

Manufacturing Integration Manager
Roles and Responsibilities

Roles

- Direct report to Manufacturing Chief Engineer (Leader 2) and AVD ME Director (Leader 1)
- Be the voice of Manufacturing and Manufacturing Engineering in the Program/Project for Portfolio Planning Studies, Architecture Development (ASSI – AC), Program Framing (DSI development), and Global Vehicle Development Process (DSI - LTR) (such as APET, PET, and VAPIR)
- Provide Manufacturing and Manufacturing Engineering interface to all Program Team functions
- Lead the development of ME responses in the PQRR Events
- Ensure Proper Participation in the Program's Virtual Activities
- Be the single point of contact for Manufacturing Investment and Manufacturing cost on a given Program/Project
- Provide Manufacturing and Manufacturing Engineering direction in CAB and Launch CAB meetings
- Participate in the Design Concept Sheet Process

Responsibilities

- Implement Global Manufacturing Strategies (such as BOP, BOE, and Inter-build ability)
- Lead the ME Program/Project Team (also known as ME Concept Team at GME, Manufacturing Integration Team at GMNA & AP) and ensure all members trained
- Ensure completion and integration of all Manufacturing deliverables and Manufacturing Validation Build (MVB) Plan per Global Vehicle Development Process (GVDP) timing
- Ensure development of Material, Body, Paint, and GA Validation Plans and the Quality Launch Plan
- With the Program Engineering Manager Lead the resolution of Integration Vehicle Build issues
- Communicate program information to Manufacturing and Launch Team
- Establish Issue Resolution Teams (IRT) prior to Integration Builds and lead process
- Develop and drive adherence to master Timing Plan
- Conduct daily Launch meetings as scheduled during MVB and Acceleration
- Feedback lessons learned
- Lead development and determine impact of Make or Buy studies, logistics concepts (e.g. SILS), and layout concepts on Manufacturing Investment to identify opportunities to meet investment target
- Ensure Decision Fixed Point information provided to Product Engineering on time
- Ensure VAA process planned & implemented
- Be the single point of contact for Manufacturing Investment including Manufacturing Flexibility, BEC reduction, Production Launch Performance, and Quality targets (for Charter)
- Obtain Program Information from Lead Region and provide input to Lead Region during development of Lookshare programs (coordination with arch. MIM)
- Participate in Program Timing Workshops to ensure Mfg/ME timing requirements met including IDR, MMR, and P-Release Timing
- Provide Manufacturing input into development of initial Integration build requirements including quantity, type, build location, slow builds (PVB), and Manufacturing Confirmation Builds (MCB)

Deliverables

- Develop forecast for pre-production budget expense prior to week -100
- Drive Product Design (PDPD) / Review Product Design for manufacturability issues at POP's meeting

- Ensure development of ME Concept sheets for new requirements and improvement ideas
- Ensure establishment of an integrated set of Manufacturing Engineering (ME) Requirements required to develop the optimum product designs, manufacturing processes, and manufacturing facilities
- *Ensure Global Installation Hand Off Procedure is followed*
- Utilize the Manufacturing Requirements (MR) process and MR database to document, communicate, and ensure implementation of Bill of Process (BOP) requirements
- Identify non-compliance to the Manufacturing Requirements and escalate to management

Material Launch Manager
Roles and Responsibilities

Roles

- Reports to the *GSC* Material Launch Group
- Participates in the *GSC* Material Launch Manager Staff Meeting
- Liaison to the Plant Material Director and the Plant Launch Manager or Manufacturing Program Manager.

Responsibilities

- Lead Material Launch Readiness Team and establish meeting schedule.
- Select, Supervise, and Coordinate the activities of the Plant Material Launch Coordinator's and any bargaining unit support.
- Leads the material readiness process with cross-functional members to provide information, direction and establish priorities during each phase of the program cycle.
    - Track and report the parts status for the various builds during the program cycle
    - Develop plan for containment of Pre-Production materials and obsolete parts
    - Ensure latest parts are available for Manufacturing Validation Builds
- Present *GSC* PQRR Status – present material flow status at PQRRs.
- Work with NAC Containerization on specialized container designs and ensure appropriate buy off signatures.
- Establish and define receiving processes and dock requirements including truck and railcar unloading/loading aisles, etc., within GLOBAL MANUFACTURING SYSTEM.
- Responsible for developing and executing the Supply Chain Part Planning
    - Line side presentation and delivery
    - Storage location, equipment analysis and manpower
    - Banking and service requirements
    - CMA, Pre-kitting, Small Lot quantities
    - Internal/External Material Flow Plan
- Report out Material Launch Readiness Reviews for program status.
- Coordinate status of Material Deliverables for Manufacturing Readiness Review (MRR).
- Provide a link between *GSC* and launch team to communicate requirement changes for MVB orders.
- Assist in coordinating the paper build process at assembly plant
- Provide support Future Material Availability (FMA) with material readiness for validation builds
- Attend daily/weekly meetings and reviews to support, as required, including: PQRRs, EWO, Readiness Layout, PDT, SMT, PET, IRT, MCE Team, Daily Wrap-up, etc.
- Assembly Plant input into the GPSC sourcing recommendation process through the Material Launch Planner and the Sourcing Supply Chain Planner.
- Assist IE in establishing delivery routes and process for bulk and small lot containers within the Plant (i.e., dolly exchange, light weight and tuggable, etc.).
- Support sequencing and subassembly strategies including:
    - Business cases
    - SOR development and completion
    - Supplier capability
    - Specialized equipment requirements
- Support development of the material plan for concurrent builds (if applicable).
- Supports Plant to execute material plan for concurrent builds (if applicable).
- Assures NA Logistics have developed transportation plans to support the program.
- Work with the Material Launch Planner to document all part related material flow items within the Plan For Every Part (Supply Chain Part Planning) system.
- Support Plant layout reviews representing Plant Material Handling issues and concerns during layout development.
- Work with 3rd Party Manager and sequencing suppliers on Plant processes and systems requirements.

Deliverables

- Complete hand-off of operation responsibilities to the Plant Material Organization.
- Ensures the Containerization Plan is developed and executed for all commodities.
- Develops and maintains material routing, footprint and flow for in-plant functional evaluation builds and manufacturing validation, through acceleration.
- Validates material packaging, containers and return route process.
- Validates and supports Subassembly and sequencing strategy.
- Facilitates material delivery for Manufacturing Validation Builds. Including any kitting requirements.
- Validates material flow and shipping plan – reference PLP Owner’s Manual E15 checklist.
- Establish industrial mobile equipment requirements working with the Assembly Plant (includes fork trucks and/or tuggers).
- Define material operations, strategies, set up and flow within each respective area (i.e., kitting, point of use, etc.)
- Together with Industrial Engineering, Manufacturing and SCP, map out the program material flow process and requirements in support of GLOBAL MANUFACTURING SYSTEM.
- Establish bulk CMA process (at Plant and/or offsite).
- Establish small lot CMA process (at Plant and/or offsite).
- Define Plant indirect material flow process (i.e., General Store's requirements, SPO, etc.).

Paint Shop Launch Manager
Roles and Responsibilities

Roles

- Reports directly to the Plant Launch Manager.
- Liaison to the Paint Shop Area Manager for the Launch Team issues.
- Leads the Paint Shop launch activities with support from the Plant Planner, departmental Business Manager and other plant personnel.
- Utilizes Plant knowledge, relationships and authority to “get things done.”
- Engaged in Program from Verified Data Release (VDR) to Launch Team Release (LTR).

Responsibilities

Product Interface & Issue Resolution Process

- Utilize Production Knowledge, analyzes major design, tooling and specification for SPQRC issues, pulling on additional support as required.
- Interface between body group, sealer suppliers and the paint shop to incorporate the design and application of new materials in the paint facility.
- Coordinates the interaction between Body Shop and General Assembly for resolution of Paint Shop issues whose root cause is found to have originated within those departments.
- Integral member of the problem resolution teams in the Paint shop, ensuring that the problem solving process is being utilized.
- Executes the change management process for internal process control (tooling, material, etc.); Coordinates with Body and General Assembly.
    - Works with the Change Management Coordinator to develop plans for Production Trial Runs, Engineering Tryouts, Engineering Work Orders, etc. during the launch process.
    - Works with the Change Management Coordinator to understand all Temporary Engineering Work Orders, reworks and part substitutions for their impact and timing.
- Provides Leadership during the Daily issues meeting with Manufacturing and Engineering.
    - Root Cause established
    - Owner assigned
    - Containment is in place
- Conducts daily Issues Resolution Team/Superintendent meetings to resolve build issues and achieve schedule.
- Coordinates rework or replacement of non-salable parts on salable vehicles with support from other plant departments and Product Engineering.

Program & Deliverables Timing

- Provides Level 1 & 2 outline for all Paint Shop Master Dot activities, ensuring updates are with the appropriate countermeasures.
- Communicates Paint Shop’s status to the Plant Launch Manager and the Paint Shop Area Manager.
- Works with the Material Launch Manager to help coordinate and validate the material plan for Paint.
- Coordinates quality plans with Quality Systems.
- Holds team accountable to achieve manpower targets.

Process Validation

- Ensures that the Paint Shop manufacturing validation plan supports the acceleration schedules and comprehends the plant build restrictions.
- Coordinates builds with the Paint Shop, emphasizes on Safety, Quality and Thru-put.
- Ensures that Paint Shop ergonomic reviews are occurring and corrective actions are developed.
- Manages the review and buy-off of Paint Shop responsible items on the vehicles before shipping
- Utilizes established verification process to validate workstation layout, ergonomics, error proofing, and operator certification by start of manufacturing validation build (ref. Manufacturing Process Validation-Workstation Readiness).
- Ensures vehicle validation requirements are met.

- Urethane
- Structure Foam
- Sealers, Etc.

◆ Ensures the Paint Bill of Process (BOP) is met and executed for the Paint Shop
- Sealing
- Film build requirements
- Validation with current production system
- Transfer efficiencies
- Paint system validation

◆ Works with the Material Launch Manager to help coordinate and validate the material plan for the Paint Shop.
◆ Ensures hold open/close devices are developed and validated during MVB.

Education & Training

◆ Identifies and develops the Paint Shop training and workshop plan, and ensures its execution.
◆ Implements lessons learned from previous programs and captures lessons learned during the program execution.
◆ Ensures active participation during the Process Verification Builds.

Administration

◆ Provides leadership to the Paint Shop launch structure.
◆ Coordinates daily activity of launch personnel.
◆ Manages all activities between PIT/IRT, facilities, equipment and budget.
◆ Establishes plant participation for Validation Center builds and tool shops for system buyoffs.
◆ Establishes roles and responsibilities for the Paint Shop Launch Team.
◆ Selects and supervises the Plant Paint Shop Team for Pre-Production build events.
◆ Exhibit active participation as a member of the Launch Team and attends all Launch Team meetings.
◆ Responsible to forecast and coordinate the necessary plant resources required during the launch (E.G. skilled trades, checkers, and production operators).
◆ Gives input for pre-production budget requirements: resources, materials, training aids, etc.

Deliverables

◆ The Paint Shop Manager is responsible for the flawless execution of the program deliverables within Paint shop.
◆ Identify and resolve issues to ensure a successful launch.
◆ Trained Paint Shop organization.
◆ Share Lessons Learned.

PIT Leader
Roles and Responsibilities

Roles

- Leads and sets direction for the respective Plant Issue Team (PIT)
- Provides focus for the Plant Issue Team
- Facilitates PIT meetings and sets meeting agenda and schedules
- Ensure communication of daily status with IRT Co-Chairs
- Tracks and Reviews all new build issues as well as issues previously entered into the Manufacturing Issues Database

Responsibilities

- Assigns resources from the PIT to solve issues in Diamonds 1-4
- Elevates open Build Issues not resolved in Diamonds 1-4 to the respective IRT Co-Chairs
- Facilitates the execution and communicates the results for engineering tryouts (ETO) and Plant Trial Runs (PTR) to the respective IRT Co-Chairs
- Attends IRT and Wrap Up meetings
- Ensures that assembly plant organizations are engaged in the launch process and planning activities as applicable
- Leads plant area teams to ensure training of assembly plant operators is complete to scheduled timing
- Provides input to the assembly line balance process and confirms that latest changes are communicated between various launch functions
- Ensures that all build issues are captured and transferred to Blue Cards/PPS sheets/ Plant Issue Documentation Cards prior to PIT meetings
- Develops plans for execution of all plant build events for appropriate functional area
- Ensures certification of work stations and assembly operator readiness specific to each build event,
- Verifies that all plant systems are functional prior to build events
- Verifies that all required visual aid documents, operator assist requirements, and job design criteria are met as applicable for each build event
- Coordinates plant hourly resource requirements as applicable (containment labor, operator training, build requirements, special requests, etc)
- Responsible to have all Blue Card/PPS sheets/ Plant Issue Documentation Card Issues entered into the PRTS+ Launch Preliminary Root Cause (PRC) stage

Plant Launch Manager
Roles and Responsibilities

Roles

- Direct report to the Manufacturing Chief Engineer (Leader 1) and plant management
- Engaged in the Program from week -100 to Launch Team Release (LTR)
- Shares responsibility for the program launch with the Program Engineering Manager (PEM) and Manufacturing Integration Manager (MIM)
- In conjunction with the Program Engineering Manager and Manufacturing Integration Manager, represents the Launch Team as the single voice in all external communications.
- Focuses on plant readiness, operations meeting, tool install tracking, operation readiness, operator training, layouts, and Plant Issue Team (PIT) staffing
- Lead the Plant Launch Team for all Manufacturing Builds Events (IV, PVB, MCB, PPV, MVB)

Responsibilities

Product Interface & Issue Resolution Process

- Provide assembly/manufacturing input into product design/design changes.
- Provide leadership during the daily issues meeting and facilitates launch build wrap-up events
- Coordinates manufacturing input for PQRR related activities. Voice of the plant in PQRR pre-reviews.
- Facilitates resolution of major process issues across functional groups, ensuring that the problem solving process is being utilized. (MID/PRTS)
- Ensures that the Launch Team executes the product/process change management processes
- Provides Leadership during the Daily issues meeting with Manufacturing and Engineering.
    - Ensures Root Cause established
    - Confirms Owner assigned
    - Ensures Containment is in place
- Supports Process Development Reviews by ensuring Area Coordinators regularly reviewing operation planning
- Attend and support Design and Process plus System Layout Reviews.
- Drives consensus (single voice for Manufacturing Engineering/Manufacturing).

Program & Deliverables Timing

- Manages the development and maintenance of the Master Dot Process at the plant (hand off from the MPM), including the responsibility of the integration of the timing and schedule of the associated Master Plans
- Communicates program status to the Manufacturing Chief Engineer and Plant Management
- Holds team accountable to achieve manpower targets
- Works with the Plant Staff to develop the employee launch involvement and enthusiasm plan
- Ensures each functional area establishes and executes their plans to support the product program
- Coordinates with the assembly plant to create and publish a weekend work package, which identifies all work being performed at the assembly plant, during construction an all launch phases of a new product program
- Ensure that deliverables owned by the Plant Launch Manager and direct reports are managed and updated through the appropriate reporting system
- Establishes and communicates program launch plans & changes and responsible for the launch communication
- Responsible to ensure the execution of all the plant key plans developed, including Manufacturing Process Validation Plans

Process Validation

- Ensures that the manufacturing validation plan supports the acceleration schedules and comprehends the plant build restrictions

- Ensures that the total plant simulation has been performed and throughput issues are identified and driven to resolution
- Develop acceleration restrictions with the plant planner, marketing, engineering, etc.
- Ensure execution of the quality plan developed by the Quality Launch Manager and the plant
- Support the internal Quality Attainment and stretch target development
- Manages the manufacturing process validation plan and execution
- In conjunction with the Program Engineering Manager ensure the proper execution of the Matching initiatives for the program
- Ensures that ergonomic reviews are occurring and corrective actions are developed
- Ensures that there is a review and buy-off of the vehicles before shipping
- Manages the tracking and shipment of Pre-Production vehicles built in the plant
- From Virtual Integration Vehicle Assessment forward, participate in Virtual Engineering Activities
- Responsible for line balance, quality stations, torque monitoring and error proofing equipment, including the attainment of the GMS targets

Education & Training

- Identifies and develops the Launch Team training process, workshop plan, and ensures its execution.
- Ensures success of the Operator and skilled trades training, through development and execution of the plan
- Implements lessons learned from previous programs and captures lessons learned during the program execution
- Ensure active participation during the Process Verification Builds
- Define, develop and train Plant Issues Teams (PIT) and Issue Resolution Teams (IRT)
- Lead Global Launch and MVB workshops and developing gapping strategy for MVB Plan

Administration

- Responsible for staffing of the plant execution team and managing the allocation of resources across key areas.
- Manages plant containment labor, ergonomics, tools and equipment, and ALL Manufacturing builds issues
- Responsible for facility issues, including manpower staffing to support dimensional checks, additional quality reviews, GCA, Direct Run Targets and (Management of Master Dot Process)
- Coordinates daily activity of launch personnel.
- Build events, timing, and team travel plans.
- Establish travel plans, housing requirements, communications devices, and launch action center facilities for the Launch Team at the plant site.
- Develops launch support manpower forecasting and tracking charts, and obtains consensus with Manufacturing Engineering and, working through the PEM, Systems Management Teams (SMT's), as to specific resources required.
- Manages the pre-production budget requirements: resources, materials, training aids, etc. after week -100
- Responsible for ensuring the execution of the Asset Recover of MCB units.
- Manages Launch Action Center requirements with plant and functional partners.
- Responsible for daily launch communication and consolidation of information for Manufacturing Readiness Reviews

Deliverables

- Launches the Vehicle Program on time and within the Quality Requirements
- Identify and resolve issues to ensure a successful launch
- Trained Assembly Plant organization
- Along with the MIM and PEM, ensure the Program Launch Team follows the Global Launch Process
- Documentation of lessons learned

Plastics Launch Manager
Roles and Responsibilities

Roles

- Direct report to the Plant Launch Manager.
- Liaison to the Plastics Area Manager for the Launch Team issues.
- Leads the Plastics launch activities with support from the Plant Planner, departmental Business Manager and other plant personnel.
- Utilizes Plant knowledge, relationships and authority to "get things done."
- Engaged in Program from Verified Data Release (VDR) to Launch Team Release (LTR).

Responsibilities

Product Interface & Issue Resolution Process

- Utilizing Production Knowledge analyzes major design, tooling and specification for SPQRC issues, pulling on additional support as required.
- Actively engaged with the Engineering counterpart to ensure the Process Engineering requirements are met and executed for Plastics.
- Coordinates the interaction between Body Shop, Paint and General Assembly for resolution of Plastics issues whose root cause is found to have originated within those departments.
- Integral member of the problem resolution teams, ensuring that the problem solving process is being utilized properly.
- Executes the change management process for internal process control (tooling, material, etc.) Coordinates with body, paint and General Assembly.
  - Works with the Change Management Coordinator, to develop plans for Production Trial Runs, Engineering Tryouts, Engineering Work Orders, etc. during the launch process.
  - Works with the Change Management Coordinator to understand all Temporary Engineering Work Orders, reworks and part substitutions for their impact and timing.
- Provides Leadership during the Daily issues meeting with Manufacturing and Engineering.
  - Root Cause established
  - Owner assigned
  - Containment is in place
- Conducts daily Issues Resolution Team/Superintendent meetings to resolve build issues and achieve schedule.
- Coordinates rework or replacement of non-salable parts on salable vehicles with support from other plant departments and Product Engineering.

Program & Deliverables Timing

- Provides Level 1 & 2 outline for all Plastics Master Dot activities ensuring updates with the appropriate countermeasures.
- Communicates Plastics status to the Plant Launch Manager and the Plastics Area Manager.
- Works with the Material Launch Manager to help coordinate and validate the material plan for Plastics.
- Coordinates quality plans with Quality Systems.
- Holds team accountable to achieve manpower targets.

Process Validation

- Ensures that the Plastics manufacturing validation plan supports the acceleration schedules and comprehends the plant build restrictions.
- Coordinates builds with Plastics, emphasis on Safety, Quality and Thru-put.
- Plays an active role in the development of the Plastics dimensional tune-in plan.
- Ensures that Plastics ergonomic reviews are occurring and corrective actions are developed.
- Manages the review and buy-off of Plastics responsible items on the vehicles before shipping.
- Utilize established verification process to validate workstation layout, ergonomics, error proofing, and operator certification by start of manufacturing validation build (ref. Manufacturing Process Validation-Workstation Readiness).

- Ensures GM Appearance Specification is met with painted parts.
- Supports General Assembly Matching build activities for build events M3 & M4 by working closely with the GAE Quality Lead in executing the matching requirements. (Is done by Home Plant Team in GME.)

Education & Training

- Identifies and develops the Plastics training and workshop plan, and ensures its execution.
- Ensures that skilled trades training is developed and being executed.
- Implements lessons learned from previous programs and captures lessons learned during the program execution.
- Ensure active participation during the Process Verification Builds (slow builds).

Administration

- Provides leadership to the Plastics launch structure.
- Coordinates daily activity of launch personnel.
- Manage all activities between PIT/IRT, facilities, equipment and budget.
- Establishes plant participation for Validation Center builds and tool shops, for system buyoffs.
- Establishes roles and responsibilities for the Plastics Launch Team.
- Selects and supervises the Plant Plastics Team for Pre-Production build events.
- Exhibit active participation as a member of the Launch Team and attends all Launch Team meetings.
- Responsible to forecast and coordinate the necessary plant resources required during the launch (E.G. skilled trades, checkers, and production operators).
- Input into pre-production budget requirements: resources, materials, training aids, etc.

Deliverables

- The Plastics Launch Manager is responsible for the flawless execution of the program deliverables within Plastics.
- Identify and resolve issues to ensure a successful launch.
- Trained Plastics organization.
- Share Lessons Learned

Program Engineering Manager
Roles and Responsibilities

Roles

- Reports to the Vehicle Chief Engineer (VCE).
- Co-Chairs the program launch with the Plant Launch Manager (PLM).
- Attends all Launch CAB Meetings and is the voice for Engineering during approval of engineering changes**.**

Responsibilities

- Facilitates resolution of major product issues across functional groups.
- Supports the internal Quality Attainment and stretch target development.
- Assures that each Systems Management Team establishes and executes their plans to support the product program.
- Drives resolution of concerns through launch team.
- Manages product/process change implementation during launch with the Plant Launch Manager.
- Supports Manufacturing Validation execution by assuring validated product to support program build events
- Manages Launch Action Center requirements with the Plant Launch Manager, plant and functional partners.
- Manages in-plant activities of product engineering launch personnel.
- Ensure that all requirements of the Matching Initiative are met and drive issue resolution activities from the Matching Events

Deliverables

- Drives common processes and helps define and support program imperatives.
- Assures balance of product and manufacturing requirements.
- Develops product engineering launch support requirements and obtains consensus with Systems Management Team’s on resources required.
- Provide product engineering support/deliverables for Program Quality Readiness Reviews and other program updates.
- The Plant Launch Manager and the Program Engineering Manager represent the Launch Team as the single voice in all external communications.
- Documentation of lessons learned.

Program Investment Manager
Roles and Responsibilities

Roles & Responsibilities

- Reports to and supports the Mfg. Chief Engineer/Global Mfg. Chief Engineer.
- Tracks Product Appropriation Requests under the following summary categories:
  - WFG
  - Paint
  - Dimensional (includes die checking fixtures, assembly fixtures, CMM, vision – perceptron, etc.)
  - Body Shop
  - Stamping
  - Manufacturing Blocked Funds
  - WBBA Blocked Funds
  - VAA (Value Added Assembler)
  - GAE
  - Systems (includes IS & S, CRW plant floor systems)
  - Containerization
  - Material Delivery (recommended based on VSM)
- Consults with Manufacturing Integration Manager/Production Launch Manager in the development of the Pre-Production & Start-up Budget
- Supplies investment status summary report for total manufacturing costs as required.
- Investigates and pursues methods to save project dollars related to manufacturing investment.
- Attends CAB & PET Meetings as required
- Monitors integrated manufacturing schedule to ensure bid pack timing meets requirements as required
- Attend Major bid pack planning meetings and development reviews as required
  - Read major bid packages
  - Ensure bid package awards meet budget
- Investment reviews (forecast) meetings with Functional Areas as required
  - Monitor detail – forecast dollars
  - Manage variances
- Monitor Projects Using GMTOPS
  - Ensure TOPS line item adjustments are approved
  - Apply Appropriations/Accounting Cost Element matrix
- Review Field Orders and COLS for appropriate content and cost, as required
- Evaluate EWOs and CR/DN for Manufacturing Costs Impacts and ensure funding as required
- Identify and remedy possible variances within Manufacturing Areas
- Consult with functional areas to remedy funding issues
- Ensure project closure with funds being returned to the corporation
- Coordinate with WBBA Capital Management for benchmarking

Program Quality Manager
Roles and Responsibilities

Roles

- Single Voice for Product Development Quality (PDQ) to the Vehicle Line Team (VLT), Program Execution Team (PET), Manufacturing Integration Team (MIT), and Vehicle And Performance Integration Review (VAPIR) Team, for a given program(s)
- Assess and ensure that all Quality business plan objectives and deliverables are being met. Escalate (pull Andon cord) to executive leadership when assistance is needed
- Support General Motors – Global Manufacturing System (GM-GMS) and Global Launch Process/Deliverables as defined within the Global Vehicle Development Process (GVDP)
- Educate, train, and communicate PDQ processes to team members, as required

Responsibilities

Program Quality Leadership

- Provide focus to the Launch Team on VLT quality business plan objectives
- Assess execution to meeting quality business plans. Escalate and support (pull Andon cord) when executive leadership is required (Program Quality Escalation Process)
- Develop and present requests for Field Performance Evaluation (FPE) Customer Satisfaction Actions
- Review, capture, and apply Best Practices and Lessons Learned
- Coordinate management/executive reviews of the Quality process/system (Quality Assessment, CTF)
- Support flawless launch initiatives and participate in cost saving initiatives affecting quality.
- Review CTF issues in Current Product Improvement Process/Team (CPIP/CPIT) for documentation and resolution of carryover content issues

Quality Planning and Target Setting

- Manage the Common Program Quality Plan
- Establish Program Quality Vehicle Imperatives/Targets (JD Power Glide Path, Warranty Glide Path, Warranty Cost/Vehicle 12 Month in Service (MIS), 36/48 Month in Service Warranty Cost/Vehicle, Consumer Report Recommendation, Reliability/Durability, CTF Mileage Accumulation) and communicate to the Launch Team
- Coordinate and communicate Quality target allocations with the Program Engineering Manager (PEM) and Launch Team
- Monitor and track business plan/internal Quality metrics
- Update MRR PQRR status and/or program notebook, as applicable, with Quality Imperative/Program status

Quality and Readiness Reviews (Vehicle Launch)

- Schedule and execute the hardware Program Quality and Readiness Review (PQRR) Process within the VLT, including quality ride assessments, as applicable
- Execute Quality deliverables within the Global Vehicle Development Process (GVDP) as required/applicable
  - PQRR (Integration)
  - PQRR (Product and Process Vehicle Validation)
  - PQRR (Manufacturing Validation Build Non-Salable)
  - PQRR (Manufacturing Validation Build Salable)
  - PQRR (Production)
  - PQRR (Ship to Commerce
  - PQRR (Launch Team Release)
  - Document status, results, and required follow-up. *GMNA* Post on the web site, as required. http://quality.gm.com/product_dev_qlty/quality_valve/qlty_valve_info.html - top
- Participate and support Launch Team activities to ensure program quality business plans, metrics, and PQRR deliverables are being addressed

Quality Assessment

- Develop and implement the Quality Assessment Test Plan
- Assist in developing the Quality Assessment glide path charts (JD Power and 12MIS Warranty)
- Expedite and track vehicles to be used in the Quality Assessment Process and support deep-dive reviews to resolve issues
- Manage the Quality Assessment glide path chart's top issues list
- Review and communicate 12 months warranty and JD Power glide path charts and pareto of issues
- Participate in quality assessment review process for rating of issues (QA rated **4**: >90% of customers would object; **6**: 10% - 90% of customers would object; or **8:** <10% of customers would object; **N:** Comment only – no rating
- Support and participate in Perceptual Quality reviews and initiatives
- Track vehicle quality performance (Warranty, JD Power, Consumer Report, Reliability/Durability, glide paths)
- *Participate in Warranty Parts Return Center Reviews*
- Participate in exterior color harmony buy-off process and interior part/boundary sample reviews, as applicable
- Participate in defining quality requirements on the dimensional management plan
- Schedule and coordinate PQRR vehicle ride events and generate PRTS+ documentation for PQRR vehicle ride issues

Captured Test Fleet (CTF)

- Plan, implement, and execute the Captured Test Fleet process including establishing a Priority Drivers List with appropriate Launch Team Members
- Provide Captured Test Fleet vehicle support including expediting shipment, delivery, and assignments to priority drivers in support of issue identification and meeting mileage requirements (if required)
- Manage the combined Captured Test Fleet/Quality Ride process, as required
- Manage the Captured Test Fleet Retrofit process minimizing the number of required retrofits. Approve all retrofits to be done outside the assembly plant (salable vehicles only). Maintain official retrofit list, worksheets, vehicle information, procedures, part numbers, total quantity, cost, and final disposal plan
- Support Launch Team, powertrain, and other functional initiatives to execute flawless launches by early identification and resolution of issues
- Communicate CTF issues to the Launch Team, and those determined to be appropriate, to Issue Resolution Team (IRT) members for entry into the appropriate problem tracking system (i.e., Manufacturing Information Database (MID), Single Issues List (SIL), or Problem Resolution and Tracking System (PRTS+))
- Lead Quality Problem Identification Process including communication, alarm and escalation process, problem tracking, and ensure countermeasures are effective for CTF issues (see attached flow diagram)
- Support Diagnostic Trouble Code (DTC) monitoring and cost avoidance on CTF vehicles
- Initiate, support, and assist in coordinating CTF and customer clinics/reviews, as required

Purchasing Launch Team Coordinator
Roles and Responsibilities

Roles

- Direct Report to the Readiness Supervisor
- Supports Supplier Quality Launch Team
- GPSC contact point for the change management process

Responsibilities

- Process Launch CAB Priority 1 Part Work Orders (PRT) during the Manufacturing Validation Builds through to acceleration* for Cost & Timing estimates (only Cancel / Replace part number work orders).
- Interface as required with Suppliers and Design Release / Design Engineers to clarify Part Work Orders for Cost & Timing Estimates.
- Communicate Cost and Timing Information from Suppliers to Engineer, Change Management Leader and Production Buyer.
- Participate in Launch CAB, providing Cost & Timing information and supports the Launch EIT with PPAP information during the "Red Zone".
- Notify Supplier and Production Buyer when Launch CAB Priority 1 Part Work Orders are approved to Cost and Timing estimate.

Deliverables

- Sends Suppliers Cost and Timing Estimate Form for Launch CAB Priority 1 Work Orders.
- Provides completed Cost and Timing Estimate from Supplier, within agreed time, to Launch Cab (DRE, CML and Buyer) for review.
- Sends a copy of the “Work Authorization Letter” to the Supplier and Production Buyer upon approval of Part Work Order at Launch Cab (Work Authorization Letter is only for work Orders approved to Supplier’s Cost and Timing).
- Maintains a file of Cost and Timing Estimates along with “Work Authorization Letter”.
- Sends Cost and Timing Estimate to Readiness Coordinator to assist in monitoring for PPAP.
- Provides PPAP information to the Launch EIT.

Outside the Scope of the PLC:

Does not get Cost and Timing for all Lear Work Orders due to ICE
Does not get Cost and Timing for Initial Released parts
Does not get Cost and Timing for Directed Buys / Tier 2 & 3 Suppliers

* Through acceleration means when the Launch Team is Released (LTR).

Purchasing / Supplier Quality Launch Manager Roles and Responsibilities

Roles

- Reports to the Supplier Quality Advanced Launch Director
- Supports the Plant Launch Manager

Responsibilities

- Participate in MVB / IRT / etc.
- Verify GP-12 Plans / PRR Process / CS1&2
- Attack **ALL** Supplier Quality Issues
- Implements the Global Launch Process Manual

Deliverables

- Track supplier Readiness Status
- Track all issues per daily build issue matrix
- Drive Deep Dives with APQP / Build Site
- Leads PRR issue resolution per GP5 guidelines
- Drive Supplier Days at Build Site
- Drive Boundary Sample / Assembly Plant Reviews
- Select Suppliers for Executive Reviews/Visits
- Conduct Dimensional Reviews at Build Site
- Develop and implement controlled shipping strategies
- Conduct key supplier reviews
- Provide daily updates to Supplier Quality leadership defined in communication plan
- Present Supplier Quality deliverables for PQRR process after integration
- Represent Supplier Quality for In-Plant program reviews

Quality Launch Manager
Roles and Responsibilities

Roles

- Direct report to Plant Launch Manager.
- Manage the implementation of GM-GMS Built-in-Quality (and related principles) into the assembly plant Quality System
- Ensure implementation of GM-GMS Built-in-Quality into other components of the manufacturing process.

Responsibilities

- Establish, execute and track Manufacturing Quality Launch Plan to ensure all Manufacturing Quality Launch Plan deliverables are met.
- Support and execute Launch Process Deliverables
- Supervise a team of Quality Launch Engineers (if applicable)

Specific Launch Manual Deliverables

- Launch Quality Targets
- Manufacturing Quality Launch Plan Established
- Validation Plan for Manufacturing System
- Program Quality Readiness Reviews (PQRR)
- Plant Launch Team Workshop
- Process Verification of Vehicles by auditing
- Launch Process Implementation Assessment
- Quality System Tryout
- Validation of Manufacturing Major Subsystems
- Batch & Hold
- Launch Drive Audit

Quality Deliverables based on GM-GMS

- People - Qualified People
    - Staff a team of Quality Launch Engineers (if applicable)
    - Ensure quality training plan is developed and implemented for Quality processes (Ex. PQS, standardized repair for critical torque and launch processes)
    - Train Quality team members to standardized work
- Standardization - Standardized Work
    - Develop team member standardized work (e.g., SOS/JES) for all on-line and off-line Quality Functions
    - Provide inputs and requirements into production standardized work to ensure built in quality.(Ex. Push click - pull on wire connects, successive check, Andon reaction plan, etc)
- Built In Quality - Product Quality Standards
    - Create Product Quality Standards and ensure they are referenced in Production and Quality Standardized work

Manufacturing Process Validation

- Develop Quality launch plan and integrate with production launch plans (Body, Paint, GA, Press & Plastics)
- Develop and track launch targets using Build By Objective Template
- Apply/capture Quality Launch Lessons Learned
- Participate in Integration Build Events for Quality System development:
    - Ensure plant controllable product issues are identified, tracked and resolved
    - Start developing Draft Quality Standardized work (SOS/JES/IPQS)
- Ensure Logistics Optimization Center (LOC) / Sequenced In-Line (SIL) suppliers and post assembly plant operations meet GM quality requirements
- Develop a plan for non-home plant operations (CKD/SKD) communication and support
    - Build events
    - Surface quality buy-offs
    - Customer requirements

  - Lessons learned & document sharing
- Participate in PFMEA and implement controls as required for critical characteristics (ex. QCOS, PFMEA)
- Review master error-proofing list and validate error-proofing implementation
- Participate in defining, and coordinating the implementation of the dimensional management plan
- Execute export plan and participate in Port of Exit/Port of Entry reviews
- Define manpower requirements hourly/salary including additional manpower for increased inspection during launch (ex. Launch Drive Audit, Batch & Hold , in-process containment)
- Plan and Execute Operation Readiness for Quality System Tryout
- Execute Quality System Tryout and resolve quality systems issues prior to next build (including audit/inspection control plan) and resolve Quality System issues prior to next build event
- Act as Voice of Customer in the interior/exterior buy-off processes (ex. color harmony, metal surface buy-off reviews, dimensional reviews, functional builds, etc.) and part/boundary sample reviews.
- Ensure shipment of Warranty Glide Path (Quality Assessment Process) vehicles according to MVB plan
- Execute Launch Quality Problem Solving Process and confirm effectiveness (alarm and escalation processes, visual problem tracking, and effective countermeasures, reduce containment based on results)
- Assist Launch Team and Program Quality Manager (PQM) for all PQRR activities

In-Process Control & Verification

- Develop and implement plan for containment
- Implement 100% on-line Manufacturing Process (Quality) Confirmation Processes including the following (where applicable):
  - Verification Stations/Standardized Inspection Process (including Customer Acceptance Review and Evaluation)
  - Dynamic Vehicle Test (DVT)
  - Water Leak Prevention and Testing
  - 100% Squeak and Rattle Test
  - Independent Repair Confirmation (IRC)
- Implement Quality Assurance Processes including the following (where applicable):
  - Global Customer Audit
  - Launch Drive Audit
  - Batch and Hold Process
- Implement internal Quality Monitoring Processes including the following (where applicable):
  - Torque Monitoring
  - Weld Monitoring
  - GA Process Monitoring (Functional Check, Process Control Plans, part/trace-ability)
  - Paint Process Monitoring
  - Direct Material Quality Control Process (Supplier Action Center- new parts check)
  - Layered Audit
  - Mutilation Prevention

Quality Feedback/Feed forward

- Implement Quality Feedback/Feed forward Process (e.g., alarm escalation, ANDON)
- Define & Implement data collection and reporting systems requirements

Quality System Management

- Ensure Quality system is prepared for International Organization for Standardization (ISO)/ Quality System (QS)/ TS16949 certification and meet the requirements of GMS
- Update Quality System Management tools and execute MQRRs

- Ensure quality plan is updated and followed (incorporate in Business Plan Deployment)
- Arrange Manufacturing Quality Readiness Reviews (MQRRs)

Continuous Improvement

ANDON

- Ensure ANDON is implemented for all Quality operations (where applicable

Vehicle Dimensional Quality Manager
Roles & Responsibilities

Roles

- Assigned to program at Integration Vehicle Build, reporting to BIW ME Director
- Single point contact for vehicle dimensional quality from Integration Vehicle Build (IVB) thru Launch.
- Team Leader for IVB/Matching/Body Shop Validation/Launch/ Vehicle Dimensional Quality Issue Identification, Resolution, and Execution
- Possesses high level of analytical ability & interpersonal skills to work effectively with others, motivating employees. Strong leadership & communication skills and a high level of cross-functional knowledge in die/stamping, body, dimensional, & product engineering. Able to interface across several organizations to solve complex cross-functional vehicle integration issues.

Responsibilities:

- Leading decision making process/resolution/execution of all major vehicle dimensional issues from start of IVB until plant transition (including dimensional issues related to wind noise, water leak, closing effort, and sealing issues).
- Assigning issue owners and driving issue resolution to improve dimensional quality for major issues (including perceived quality/jewel effect)
- Leading the development/execution of the iterative matching/body shop validation plan
- High level reporting on the dimensional quality/status of the vehicle from IVB thru launch, including the following metrics: BIW E-31, A, B, C & Finished vehicle (FVS)
- Interfacing with all organizations outside Body ME on dimensional issues, including presentations for upper management
- Leading the TAC Fixture Reviews and problem resolution follow up related to key issues
- Driving to Resolution the major cross functional issues by getting all affected parties involved
- Leading the team in completion of the dimensional exit criteria
- The DTS gate reviews (@ PQRR MVS, EOA) to determine acceptable ship targets & DTS reconciliation

Supports:

- The Body QL & Integrators when needed to root cause issues, drive resolution, etc.
- The TDIE & Die SME in decision making related to die shipment, die change, etc
- The DPM & team in the resolution of the top dimensional quality issues prior to IVB
- The DPM & LDM in developing the Dimensional Validation Plan requirements for a detailed measurement plan for each build event (DCIP)
- The IRT Process
- Supplier Quality Issues – Exceptions to SOR’s (agreement @ contract)
- Supports the IECF process to understand the Interior Issues

APPENDIX C: Common Process Websites Listing

GM Common Process	Web Address
Assembly Verification Group	Assembly Verification Group
Bill of Material (BOM)	http://epc.iweb.gm.com/wi/workstd.jsp?docName=VDP0810&from=ml
Bill Of Process (BOP)	http://bop.gm.com/
BIW Manufacturing Validation Standard (MV1)	http://me.body.gm.com/general/Standards_Library/s00000100/
Common IS&S Process	http://quality/
Dimensional Engineering	http://body.gm.com/selfposting/Global+Dimensional+Engineering+Council
Dimensional Management	http://gmna1.gm.com/vp/dm/index_dm.html
Embassy Website	http://gmna3.gm.com/embassy/index.jsp
GAE Error-proofing	http://gae.gm.com/errorProofing/index.jsp
Global GAE Documents on European SSPR	http://sspr.gme.gm.com/ip/download/Documents/Business%20Units/Engineering/ME%20-%20Manufacturing%20Engineering/Organisation/AC/Projects%20%26%20Development/Virtual%20Engineering/Virt.%20Eng.%20APS/APS%20-%20Documentations/APS%20Process%20Training/2%20VA%20Process%20Timing%20-%20details.pdf?disposition=attachment
Global Installation Hand-Off (GIHO)	http://body.gm.com/selfposting/Global%20ME%20Common%20Installation%20Handoff%20VSM/Global%20Installation%20Hand%20Off%20Communication
Global ME Common Installation Handoff VSM	http://body.gm.com/selfposting/Global%20ME%20Common%20Installation%20Handoff%20VSM/Final%20Doc%20Tryout
Global Manufacturing System (GMS)	http://gmgms.gm.com/main/global/gmsOperatingGuidelines.jsp
Global Metrics	http://quality.gm.com/qlty_data/qlty_data_index.html - top
Global Quality Plan	http://quality.gm.com/program_quality_plan/Work_Process_Assess.html
Global Paint Polymers Center(GPPC)	http://manufacturing.gm.com/ds/docs/me/AUTOAA000054/index.htm
Global Vehicle Development Process (GVDP)	http://vdp.gm.com/gvdp/index.html
GLP Website Home page	Global Launch Process <-- Global Launch Process - Execution
GMNA Quality Website, Batch & Hold	http://quality.gm.com/mfg_quality/common_processes/manuf_proc_valid/docs/batch_hold.doc
GMVO Training Spec & Tech Manual Spec	http://supplier.body.gm.com/crw/production/main/standards/normative/controls/CE18D002/GM_ME_TT_Spec_26Apr2006PublishedFinal.pdf
IS&S Launch	http://manufacturing.gm.com/mfgiss/global_launch/
Global Matching Website	http://me.body.gm.com/dimensional/gmatch/
Launch Training Strategies - Team Members	http://gmgms.gm.com/main/global/files/TeamMemberTrainingPlanningStrategies.ppt
Lessons Learned	Global Launch Process <-- Global Launch Process - Execution
Manufacturing Engineering General Assembly (MEGA)	http://gae.gm.com/
Manufacturing Engineering Process Flow - Body	http://me.body.gm.com/
Manufacturing Quality Launch Plan	http://quality.gm.com/mfg_quality/common_processes/manuf_proc_valid/manuf_proc_valid.html#top
Master Process Plans (MPP's)	http://ie.me.gm.com/main/_PADs/
MEGA Spare Parts List Process	http://gae.gm.com/processGuides.jsp
MPP Work Instruction	http://epc.iweb.gm.com/wi/workstd.jsp?docName=VDP0550&from=ml
MRR on MPM Website	http://manufacturing.gm.com/nacg_orgs/mpmgt/common_process_mgr/mpm_bus_mngmt/homepage.html#top
MVB ONS Report Website	http://manufacturing.gm.com/manufacturing/vso/future/mvb_home.htm
Part Readiness	https://www.gmsupplypower.com/apps/supplypower/NASApp/spcds/CDSRetrieval?lob=quality&subnav=library&togglefolder=1606
Pre-Production Launch Manual (ver. 2.1)	http://gmna1.gm.com/eng/preprod/readiness/files/launchmanualVer2_1.doc
PFMEA Website	http://manufacturing.gm.com/ds/docs/me/AUTOAA000132/T000011/index.htm
PPV Build manual	http://vdp.gm.com/gvdp/doc%20files/491_gvdp_pp_val_man.ppt
Problem Resolution Tracking System (PRTS+)	http://quality.gm.com/quality_function_support/cpip_prts/index.html
Production Trial Run Process	http://usahetq02.mail.gm.com/ETOHeadquarters/naap010.nsf/569a29f1a8333311985256beb00535054/cc6dee50284matchingbd785256ae0000286a7?OpenDocument
PQRR Website Overview	http://quality.gm.com/product_dev_qlty/Global%20PQRR%20Templates/pqrr_index_home.html
Program Quality Readiness Review (PQRR/Quality Valve)	http://quality.gm.com/product_dev_qlty/quality_valve/qlty_valve_info.html
PTR / ETO; GMNA Quality website	http://quality.gm.com/mfg_quality/iso/01_qms_documentation_structure/03_procedure_templates/commonproceduresIisting.html#top
Quality as a Value; CAB and EIT	http://qav.gm.com/ecm/index.html
Safety	http://safety.gm.com/
Simulation web page	http://crw.gm.com/main/tas/tas.cfm
SSPR Website	http://sspr.naeng.gm.com:7777/pls/portal30/
Supply Power	GM SupplyPower
TIP web page	http://ie.me.gm.com/main/throughputImprovementProcess.jsp
Torque Confirmation Reviews	http://quality.gm.com/mfg_quality/common_processes/torque_monitoring/torque_monitoring_docs/Torque%20Confirmation%20Reviews.ppt
Virtual Engineering Website	http://gmna1.gm.com/vsas/ve
Weld Verification Procedures	http://supplier.body.gm.com/crw/production/main/standards/normative/welding/ws4SectA.pdf
Wiring Harness Process (D5)	http://quality.gm.com/mfg_quality/common_processes/route/route.html#top

WWP Risk Assessment	https://www.gmsupplypower.com/apps/supplypower/NASApp/spcds/CDSRetrieval?lob=quality&subnav=library&togglefolder=1606

APPENDIX E: Supplier Communication Conferences

APPENDIX G: Best-in-Class Launch Targets for Programs with SORP after June 1st 2008

	Manufacturing Launch Classification	Definition	Duration (Days)	%Volume (New Model)	Selected Targets (*reference only*)
1	Greenfield 2 or 3 Shifts	New facility	46	61%	02 Jeep Liberty @ Toledo North 2c/2s (79%-ile Launch)
2	New	First body style off of a new architecture in the first launch plant in each region (or possibly each country).	59	74%	2005 Toyota Tacoma @ NUMMI (83%-ile)
3	Major	First body style of a new program launched in a plant that is not a New Program launch	24	72%	2007 GMT900 Utility @ Arlington (89%-ile)
4	Derivative	New body style on existing architecture already produced in the launch plant.	15	67%	*2008 GMT967 Buick @ LDT (67%-ile and 2.9 LCI)*
5	MCE3	Same as GVDP Guidelines	12	90%	03 GMT800 @ PAC (90%-ile)
6	MCE2 with PT	Same as GVDP Guidelines	10	90%	Consensus due to lack of past performance data
7	MCE2	Same as GVDP Guidelines	4	90%	07 GMT345/355 @ Shreveport
8	Annual, MCE1	Same as GVDP Guidelines	2	90%	06 Annual GMT355 @ Shreveport
9	CKD3 30<x<50% Localization	- Data and experience is limited. - Targets will be refined as data becomes available. - Any CKD Launch >50% Localization will be treated as Class 1 through 5 above	15	67%	Consensus of 2005-6 CKD Launches
10	CKD2 10%<x<30% Localization		12	67%	Consensus of 2005-6 CKD Launches
11	CKD1 <10% Localization		6	84%	*2008 M200 @ GMI Halol*

Note 1: Look Share programs will be classified as Major, Derivative, etc. or "no change/no mfg launch" depending on the content and complexity seen at the assembly plant.
Note 2: Any CKD Launch >50% Localization will be treated as Class 1 through 5 above.
Note 3: For Derivatives, the first body style off the architecture in a plant is considered a "Major".

APPENDIX H: GLP Functional SME Core Team

Powertrain
Mike Hand
248-857-1403
Ron Decker
248-857-1484

IS&S
Monte Zent
248-860-6468

AVG
Dino Masella
248-867-9923

Containers
Bruce Nelson
248-343-7004

Matching
Marie Kardasis
248-249-9773

MPD/PAD
Steve Noyes
586-575-4896
Peggy Culver
586-575-3081

Marketing
Dora Nowicki
(313) 667-4085
Steve Wagg
(313) 667-5031

SQA
Robert Denk
586-492-1984

GPSC
Alain Hadorn
586-947-5607

Quality Systems
Danean G. Myers
248-343-7515

GAE
Jack Sheehan
586-947-0150

Industrial Eng
Zlatko Stevanovic
248-753-2362

Service Action Center
Scott Carpenter
248-379-9078

GSC
Helen Zimmerman
248-753-3074
Bob Jarema
248-753-3102

Vehicle Engineering
Nancy Huber
586-492-2692

GVDP
Sanjeev Mirle
586-719-0585

PQRR
Kathy Karlis
586-492-3302

Service / After-sales
James F. Doherty
(586) 947-7459
Ward L. Boyer SPO
(810) 835-9080

VSSM – Order Fulfillment
Debra Black
313-667-2979
Scott Solomon
313-665-1776

Paint (ME)
Dave Cieslik
586-709-2646

Training
Steve Howell
248-753-2471

Facilities
John Herkes
248-753-3870

Dimensional
Mitch Washer
248-379-9078

Stamping
Gary Arnold
248-753-1114

Paint (PE)
Fred Blair
586-709-2500
Rick Ogg
586-709-2696
David Sufczynski
586-709-2784

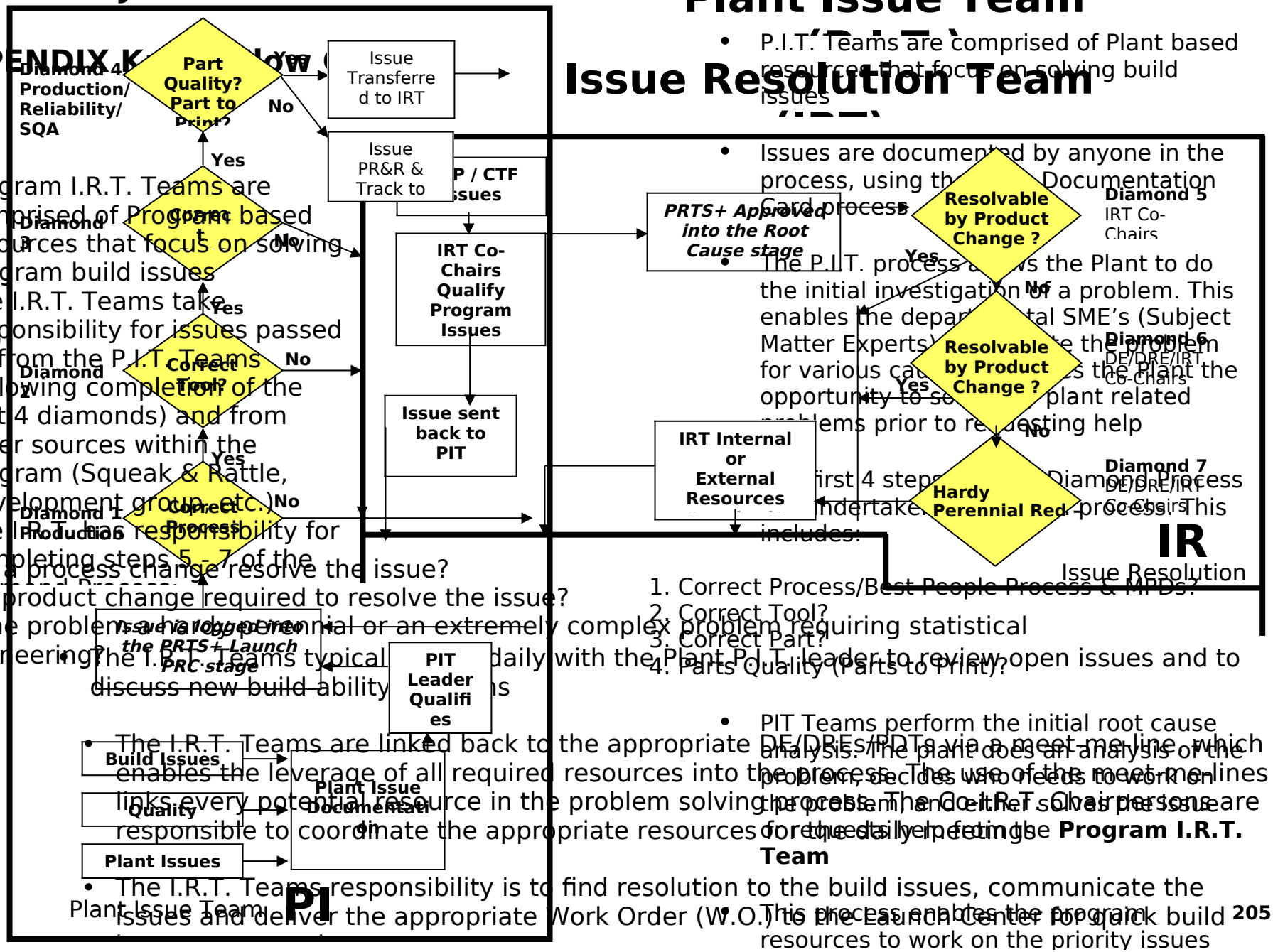
Weld Verification
Jerry Ramsden
248-249-9370
Mark Merriam
810-602-9743

Vehicle Performance (test)
Ken Morris,
(248) 684-3297

Body
Andy Raftopoulos
810-650-8037

APPENDIX J: PIT Flow Chart

APPENDIX K: Issue Resolution Team (IRT) Flow Chart



Plant Issue Team ("P.I.T.")

- P.I.T. Teams are comprised of Plant based resources that focus on solving build issues
- The P.I.T. process allows the Plant to do the initial investigation of a problem. This enables the departmental SME's (Subject Matter Experts) to resolve the problem for various causes and gives the Plant the opportunity to solve plant related problems prior to requesting help
- The first 4 steps of the Diamond Process undertaken by the process. This includes:

1. Correct Process/Best People Process & MPDs?
2. Correct Tool?
3. Correct Part?
4. Parts Quality (Parts to Print)?

- PIT Teams perform the initial root cause analysis. The plant does an analysis of the problem, decides who needs to work on the problem, and either solves the issue or the daily meeting the **Program I.R.T. Team**
- This process enables the program resources to work on the priority issues

Issue Resolution Team ("IRT")

- Issues are documented by anyone in the process, using the Issue Documentation Card process
- Program I.R.T. Teams are comprised of Program based resources that focus on solving program build issues
- The I.R.T. Teams take responsibility for issues passed up from the P.I.T. Teams (following completion of the first 4 diamonds) and from other sources within the program (Squeak & Rattle, Development group, etc.)
- The I.R.T. has responsibility for completing steps 5 - 7 of the Diamond Process:

5. Will a process change resolve the issue?
6. Is a product change required to resolve the issue?
7. Is the problem a hardy perennial or an extremely complex problem requiring statistical engineering?

- The I.R.T. Teams typically meet daily with the Plant P.I.T. leader to review open issues and to discuss new build-ability issues
- The I.R.T. Teams are linked back to the appropriate DE/DRE's/PDTs via a meet-me line, which enables the leverage of all required resources into the process. The use of the meet-me lines links every potential resource in the problem solving process. The Co-I.R.T. Chairpersons are responsible to coordinate the appropriate resources for the daily meetings
- The I.R.T. Teams responsibility is to find resolution to the build issues, communicate the issues and deliver the appropriate Work Order (W.O.) to the Launch Center for quick build

APPENDIX M: Shipping of Quality Assessment Vehicles

RASIC for Shipping of Quality Assessment (QA) Vehicles (Launch Build Phase)					
12/1/03 Meeting Attendees: Tim Bramble, Jeff Griffith, Jeff Seilkop, Burnie Gibson, Larry Wagner, Francis Diaz					
Step	**Responsible**	**Approve**	**Support**	**Inform**	**Consult**
QA vehicle is approved to be shipped to Milford PG. Note: Per June 7, 2007 VPR decision: no GCA of Saleable QAP vehicles prior to shipment to Proving Ground, only normal production / CARE process.	QLM	QLM			Plant Quality Manager
"QA Vehicle" dash notice placed in vehicle on dash on passenger side (inside vehicle) - Locate "QA Vehicle" dash notice on the Global Launch Process Web Site	QLM	QLM			
QA vehicle(s) driven into the assembly plant shipping yard	QLM	QLM		Plant Quality Mgr	
QLM notifies Logistics via Lotus Notes that QA vehicles are ready for pick-up - Lotus Note includes the following for each QA vehicle to be shipped: 1) Build Event (e.g. Man Val NS Block #1) 2) the order # and/or VIN # - For all Michigan plants, Lordstown, Moraine Janesville, Ft. Wayne and Mishawaka, send to WWPG NA PC&L Regional Field Manager (Burnie Gibson) - For all other U.S. plants send to PD Engineering Transport Group Manager (Tim Bramble) Lotus note with cc: to PDQuality Program Quality Analyst (PQA) and PD Quality Assessment Engineer - Glidepath (Bill Lancaster)	QLM	QLM		PQM	
FOR GM de Mexico: QLM contacts GMM PC&L Coordinator Pass. Veh. & North VDC (Terry Holloway) who will arrange for truck pick up and delivery and notifies GM Logistics for pick up at the border. FOR GM of Canada: QLM contacts GM of Canada Purchasing & Logistics Special Moves Analyst (Shelagy Dinneen) who will arrange for truck pick up and delivery and notifies GM Logistics for pick up at the border.	QLM	QLM		PQM	
Following GCA at plant, QA vehicle is approved to be shipped to Milford PG					
Vehicle picked up at assembly plant shipping yard	Logistics	QLM	Plant Quality Manager		
Trucking company gives Engineering Transport Group Manager (Bramble) phone call with Estimated Time of Arrival (ETA) for QA vehicles	Trucking company (driver)	Engineering Transport			

		Group Manager			
PD Engineering Transport Group Manager (Bramble) sends a Lotus Note to PQA and Bill Lancaster (PD Quality QA Group) with the following for each QA vehicle to be shipped: 1) Build Event (e.g. Man Val NS Block #1) 2) the order # and/or VIN # 3) ETA	Engineering Transport Group Manager	Engineering Transport Group Manager		1) PQA 2) Bill Lancaster at Milford QA Group	
<u>If 3-day delivery to Milford Proving Ground is at risk:</u> Trucking company gives PD Engineering Transport Group Manager (Bramble) phone call with new ETA	Trucking Co. Driver	Engineering Transport Group Manager		Engineering Transport Group Mgr	
<u>If 3-day delivery to Milford Proving Ground is at risk:</u> PD Engineering Transport Group Manager (Bramble) phones PQA with new ETA	Engineering Transport Group Manager	Engineering Transport Group Manager		PQA	
<u>If 3-day delivery to Milford Proving Ground is at risk:</u> PQA phones PQM with new ETA	PQA	PQA		PQM	
Vehicle arrives at Milford Proving Ground (MPG) Contractors Gate	Engineering Transport Group Manager	Engineering Transport Group Manager			
Engineering Transport Group notifies PDQuality QA via phone call that QA Vehicle has arrived at MPG Contractors Gate	Engineering Transport Group Manager	Engineering Transport Group Manager		PQA	
PDQuality QA notifies PQM via phone to schedule QA Start-of-Test (SOT) clipboard review of issues	PQA	PQA		PQM	

APPENDIX M: Quality Assessment

Vehicle Logistics

General Motors Corporation
M/C: 482-AO9-B95
100 Renaissance Center
P.O. Box 100
Detroit, Michigan 48265-1000

Date: December 19, 2003

To:	Allied Automotive	Penske Automotive	Jack Cooper Transport
	Amy Marshall	Dan Skinner	Richard Flucht
	248-675-7365	248-675-7537	248-675-7385

Subject: Quality Assessment Vehicles (New Vehicle Launch)

Purpose:
This letter is to inform the above service providers as to the re-direction of handling "**QA"** (Quality Assessment) vehicles produced at General Motors Assembly Plants. With the many new vehicle launches scheduled for the 2004 calendar year it is imperative that we have a sound and expedient process in place that guarantees the timely receipt and delivery of vehicles within a **3-day** time frame.

Guidelines:
"**QA" vehicles** are pre-produced new vehicle launch units that require a delivery time by the 3rd day to the Milford Proving Grounds for quality validation testing. All service providers must modify their Information Systems and communicate to their support staffs the necessity to recognize/flag and prioritize those units that are "QA" vehicles in order to meet the 3-day delivery requirement. All GM Assembly Plants in Michigan, Ohio, Indiana and Wisconsin will be required to meet this requirement. For those assembly plants outside of the above areas, the requirement will be the same however, the movement and arrangement for special moving these vehicles will be coordinated through both the efforts of the Fleet Competitive Vehicle Engineering Operations Group in Milford, (Tim Bramble-contact) and Vehicles Logistics. See details below.
Any issues relative to QA vehicles such as no-starts or quality holds that inhibit the movement of the vehicle to the Milford Proving Grounds should be communicated to the "QLM" Quality Launch Manager at the plant location.

Specifications/Details:

Ship-to-code:	sell source (all makes) - 48103
Demand Area**:**	#716
Routing:	truck away
Ship-to-location:	Milford Proving Grounds Contractors Gate 3300 General Motors Road Milford, MI 48380
Milford Hours Receipt:	Monday thru Friday 6am to 5:30 pm
Milford Contacts:	Tim Bramble 248-685-4911 Tina Bond 248-685-4912
Quality Contact:	*Mark Schweitzer GMNA Quality Assessment Manager 586-859-8216* *Francis Diaz Global Quality Assessment Manager 586-859-8295*
Visual Aid:	The "QLM" Quality Launch Managers at the plants will be responsible for placing an 8 1/2" X 11" sheet of paper in the right hand corner of the "QA" vehicles with the following information: Quality Assessment Ship-to-Code 48103 To the attention of: Program Quality Analyst name Milford Proving Ground Contractors Gate 3300 General Motors Road Milford, MI 48380
Launch Schedules:	The launch schedules have been provided to all Field Logistics Coordinators and they will be responsible to communicate those launch dates and specifics as those dates approach.

Thanks

Burnie Gibson
Vehicle Logistics

Quality Assessment
Ship-to-Code
48103

To the attention of:
“Program Quality Analyst name”

Milford Proving Ground Contractors Gate

3300 General Motors Road

Milford, MI 48380

VI. Section D - Identifies the Plant preparation and requirements necessary to support the Launch Process
VII. Section E - Identifies the In-plant build activities with emphasis on the Manufacturing Validation Build Plan.
VIII. Question & Answer session and Wrap-up

APPENDIX P: Global Launch Process Workshop Description (CTIS #16951)

PURPOSE:

- To develop a Program Launch Plan that is **compliant** with the Global Launch Process.

DELIVERABLES:

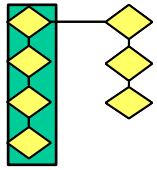
- Review each champions' plans and provide status to all of the elements of the Global Launch Process (green, yellow, and red)
- Create an events/issues list of differences between the Global Launch Process and the existing Program Launch Plan.
- Assign issue ownership & timing, as required, to the appropriate member(s) of the Launch Team.
- Assess each of the events/issues and their impacts on the program.
- Apply those events agreed upon to the Launch Vehicle Build Plan.
- Establish a Program Launch Plan and the Launch Vehicle Build Plan, obtaining Program Launch Team buy-in/agreement on adjusted activities and timing to the Launch Vehicle Build Plan.
- "Level-up" all Program Launch Team Members with the status of each plan and the direction to execute those plans.

WORKSHOP REQUIREMENTS

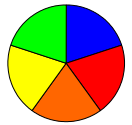
1. Program Launch Team is in place and present for the workshop.
   Global Launch Process Training (CTIS # 13542) is a prerequisite for the workshop.

Plant Issue Team (PIT) Meeting

- **Preparation**
  - Establish meeting times and frequency
  - Set up conference call and visual collaboration (e.g., WebEx)
  - Prioritize open issues and develop agenda
- **Agenda Topics**
  - Schedule and review any PTR's and ETO's
  - Review all new build issues (Issue Documentation Cards)
  - Review Containment Plans
  - Review and understand all open build issues in PRTS+
  - Provide feedback to any open PRTS+ issues as required

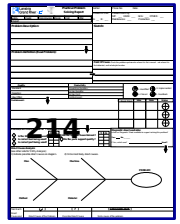


PRTS+



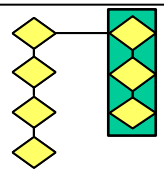
PRTS+ opened in the the Launch PRC stage

Blue Card



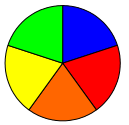
Appendix Q: Launch Execution Meetings (continued)

Issue Resolution Team (IRT) Meeting



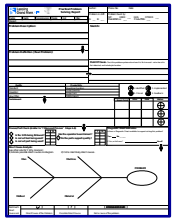
- **Preparation**
  - Establish meeting times and frequency (3-5 meetings / week)
  - Set up conference call & visual collaboration (e.g., WebEx)
  - Prioritize open issues from PRTS+ and develop agenda
- **Agenda Topics**
  - Schedule and review any PTR's and ETO's
  - PIT Leader reviews all new Issue Documentation Cards
  - IRT accepts or rejects issue elevated from Launch PRC in PRTS+ for approval into PRTS+ Root Cause status
  - Discuss Temporary Work Orders (TWOs)
  - Review prioritized PRTS+ Issues; Issue owners report status
  - IRT Co-Chairs assign resources to solve issues

PRTS+



PRTS+ opened in the the Launch PRC stage

Blue Card



Appendix Q: Launch Execution Meetings (continued)

In-Plant Build Daily Wrap-up Meeting

- **Purpose**
  - **Review the days build activity (PLM & PEM)**
  - **Review daily audit results and PRR's Issued (QLM)**
  - **Review "Top" PRTS+ issues (IRT Co-Chairs)**
  - **Solicit help to resolve issues (ALL)**
  - **Review next schedule of events and build objectives (PLM & PEM)**

Appendix Q: Launch Execution Meetings (continued)

In-Plant Build Daily Wrap-up Meeting

- **Agenda**
  - Safety
  - Recap of the day's Build Event
  - Emerging Issues
  - Quality
  - *IRT Updates*
    1. *Body Structures*
    2. *Exterior / Closures*
    3. *Paint*
    4. *Trim / Interior*
    5. *Chassis / Powertrain*
    6. *Final / End Of Line*
    7. *Squeak & Rattle*
    8. *Wind Noise & Water Leaks*
    9. *Electrical*
  - Next days Schedule of Events
  - Round Table

Appendix Q: Launch Execution Meetings (continued)

Launch Issue Escalation Meeting

- **Frequency is to occur once per week**
- **PIT Leaders report out to Launch Leaders reviewing the single issues list, one PIT at a time**
  - **Status progress of the existing PIT issues still in diamonds 1-4**
  - **Action plans, Owners, due dates (containment and next steps)**
  - **Review major emerging issues**
  - **Safety, quality, and validation issues**
  - **Request for help to support the PIT process**

Appendix Q: Launch Execution Meetings (continued)

Meeting Schedule Example #1

	Meeting	Time and Day	Call In Number	Location
	Launch CAB	6:00 to 8:00 a.m. Mon - Fri	888-422-7101 Participant Code 133955	Core Launch Trailer #19
	Wrap Up Meeting	4:00 to 6:00 p.m. Mon - Fri	888-422-7101 Participant Code 133955	Plant Auditorium
Issue Resolution Teams	Body Structure IRT	8:00 to 9:30 a.m. Tue, Wed, & Thur	888-830-6260 Participant 678481	War Room-Body Shop Office
	Exterior / Closures IRT	10:00 to 11:30 a.m. Tue, Wed, & Thur	888-830-6260 Participant 678481	War Room-Body Shop Office
	Paint IRT	8:00 to 10:00 a.m. Mon & Wed	888-271-0949 Participant 675433	Paint Mez
	Trim / Interior IRT	12:00 to 1:30 Mon-Thurs	888-271-0949 Participant 675434	Core Launch Trailer #18
	Chassis / Powertrain IRT	8:00 to 9:30 a.m. Tue, Wed, & Thur	888-830-5557 Participant 654383	Core Launch Trailer #17
	Final / End of Line IRT	10:00 to 11:30 a.m. Tue, Wed, & Thur	888-271-7659 Participant 123456	Core Launch Trailer #16
	Squeak & Rattle IRT	1:00 to 3:00 p.m. Mon & Wed	888-271-0949 Participant 675433	Audit Room
	Windnoise / Waterleaks IRT	1:00 to 3:00 p.m.. Tues & Thurs	888-830-6260 Participant 678481	Audit Room
	Electrical IRT	2:00 to 3:00 p.m. Mon - Fri	888-271-5555 Participant 66778	Quality Conference Room

Appendix Q: Launch Execution Meetings (continued)

Launch Team Meeting

- **Objectives**
  - **Preview of daily build activities**
  - **Review daily ETOs and PTRs**
  - **Review material status**
  - **Discuss quality issues**
  - **Evaluate manpower requirements**
  - **Core launch team members only**
    - **Beginning at PPV**

Appendix Q: Launch Execution Meetings (continued)

Launch Team Meeting-Sample Agenda

- **Agenda**
  - Safety
  - Daily Build Status
  - Quality Update
  - Issue Update / ETOs and PTRs
  - Material Availability
  - Round Table

- **As Required**
  - PQRR Readiness
  - Manpower Update (Containment Plans)
  - SQA Issue Review
  - Workstation Readiness
  - Captured Test Fleet Issues

Appendix Q: Launch Execution Meetings (continued)

Topics for Launch CAB

- Discuss all work orders (cost savings, etc), not just launch work orders because they may break during the "RED Zone"
- Discuss Plant Trial Runs (PTR)
  - Pre-SORP, the MVB Build Event suffices as the PTR
  - Post-SORP, the PTR needs to be scheduled by the plant
- Discuss Temporary Work Orders (TWO's)
- Review Work Orders where the TID has slipped past its original date

Appendix T: Launch Cadence Guidelines Continued

Launch Cadence within Region (Plant-to-Plant) Guidelines

New/Major: New Architecture in the Region (1st plant New, 2nd plant Major)
Recommendation: 3-4 month SORP stagger from 1st plant to 2nd plant*
Derivative: Architecture already produced in plants (New/Modified Exterior/Interior)
Recommendation: 2-3 month SORP stagger*
CKD: 1st CKD Receiver plant to 2nd plant
Recommendation: 2-3 month SORP stagger*
MCE3: Architecture already produced in plants (Modified Exterior/Interior)
Recommendation: 1-2 month SORP stagger*

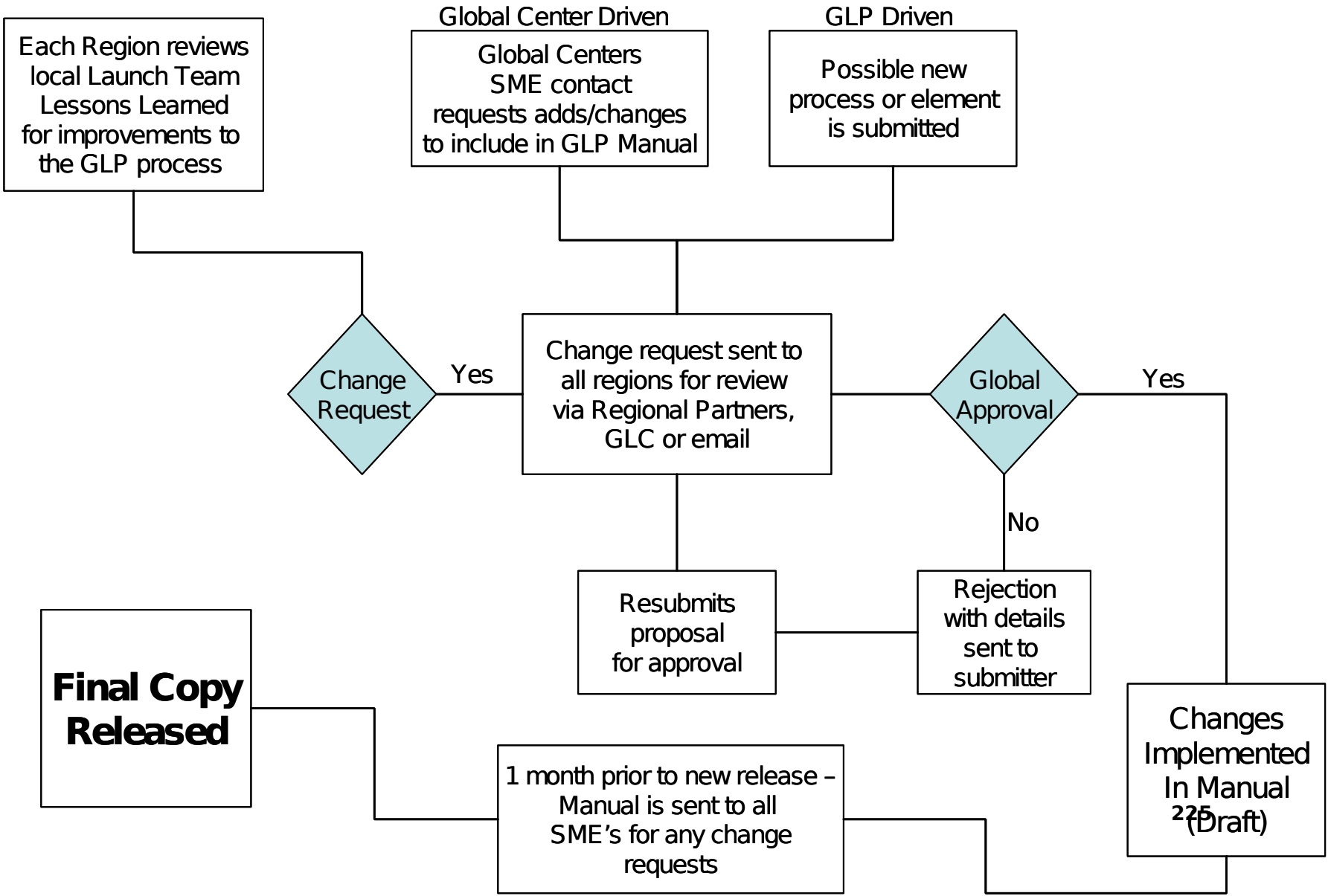
* To plan below this range requires agreement between manufacturing, ME, PE, and Purchasing.

4-24-07
Revision 2

Global Program Launch Cadence (Region-to-Region)

Look Share Programs: 3 months between Region 1 SORP and Region 2 SORP
Derivative Program in Region 2: 3 months between Region 1 and Region 2 SORP
Derivative Programs in Region 2 & 3: 3 months between Region 2 and Region 3 SORP

Note: SORP Stagger Enables shared lessons learned during the Manufacturing Validation Build Saleable event from region to region.
(GM ME NOA October, 2005)


Each Region reviews local Launch Team Lessons Learned for improvements to the GLP process
Global Center Driven
Global Centers SME contact requests adds/changes to include in GLP Manual
GLP Driven
Possible new process or element is submitted
Change Request
Yes
Change request sent to all regions for review via Regional Partners, GLC or email
Global Approval
Yes
No
Resubmits proposal for approval
Rejection with details sent to submitter
Final Copy Released
1 month prior to new release – Manual is sent to all SME's for any change requests
Changes Implemented In Manual (Draft)

Fax: (248)753-2752